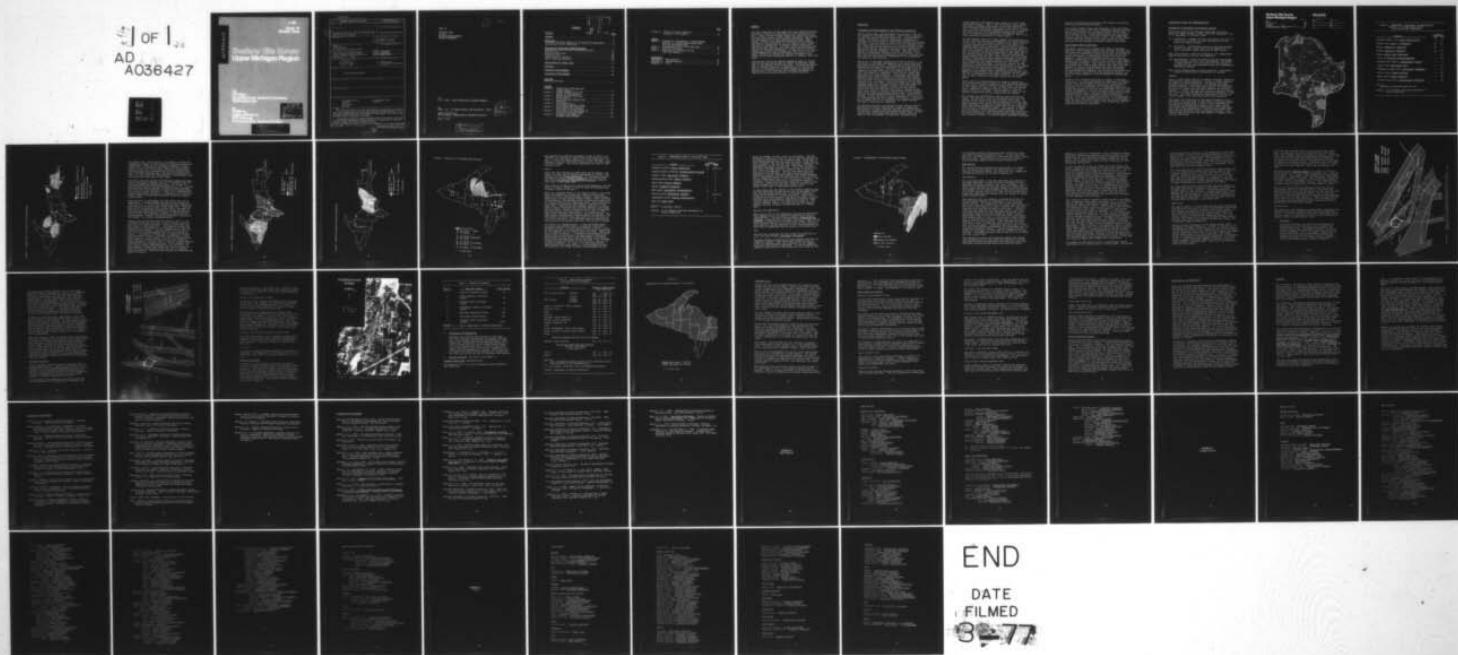


AD-A036 427 GTE SYLVANIA INC NEEDHAM HEIGHTS MASS COMMUNICATIONS--ETC F/6 17/2
SEAFARER SITE SURVEY, UPPER MICHIGAN REGION. BOOK 19. WILDLIFE --ETC(U)
APR 76 N00039-75-C-0309

UNCLASSIFIED

NL

1 OF 1
AD
A036427



END

DATE
FILMED
8-77

ADA036427

1 N
Book 19
Wildlife Data

Seafarer Site Survey Upper Michigan Region

for
U.S. Navy
Naval Electronic Systems Command
Washington, D.C.

by
EDAW Inc.
under contract to
GTE Systems
Communication Systems Division



DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

| REPORT DOCUMENTATION PAGE | | READ INSTRUCTIONS BEFORE COMPLETING FORM |
|---|-----------------------|---|
| 1. REPORT NUMBER | 2. GOVT ACCESSION NO. | 3. RECIPIENT'S CATALOG NUMBER |
| 4. TITLE (and Subtitle) | | 5. TYPE OF REPORT & PERIOD COVERED |
| Seafarer Site Survey, Upper Michigan Region. Book 19, Wildlife Data. | | 6. PERFORMING ORG. REPORT NUMBER |
| 7. AUTHOR(s) | | 8. CONTRACT OR GRANT NUMBER(s) |
| EDAW, Inc. 50 Green Street San Francisco, California 94111 | | 15 N00039-75-C-0309 |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS | | 10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS |
| Naval Electronic Systems Command Special Communications Project Office Washington, D. C. 20360 | | 11. REPORT DATE |
| (12) 64P. | | 12. NUMBER OF PAGES |
| 14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) | | 15. SECURITY CLASS. (of this report) |
| (12) 64P. | | Unclassified |
| 16. DISTRIBUTION STATEMENT (of this Report) | | 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE |
| Distribution Unlimited | | |
| 17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) | | |
| 18. SUPPLEMENTARY NOTES | | |
| 19. KEY WORDS (Continue on reverse side if necessary and identify by block number) | | |
| ELF Communications Seafarer Site Survey Michigan | | Environmental Data Wildlife |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number) | | |
| The flora and fauna of the area have undergone considerable change due to large scale logging and fires, and uncontrolled hunting and trapping. In recent years, reforestation and fire protection have reversed this trend and the wildlife complex is changing accordingly. | | |
| Hunting and fishing are rapidly expanding forms of recreation in the area, and the Michigan Department of Natural Resources is conducting an intensive program of habitat and wildlife rehabilitation. | | |

DD FORM 1473 EDITION OF 1 NOV 65 IS OBSOLETE
1 JAN 73

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

1B

BOOK 19

WILDLIFE DATA
of the
UPPER MICHIGAN REGION
PROJECT SEAFARER

for
U. S. Navy. Naval Electronic Systems Command

by
EDAW, Inc., 50 Green Street, San Francisco 94111

Under Contract to
GTE Sylvania, Communication Systems Division ✓

April, 1976

D D C
RPPH/PR
MAR 7 1977
RULOLITE
A

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

CONTENTS

| <u>SUBJECT</u> | <u>PAGE</u> |
|--|-------------|
| <u>Summary</u> | 1 |
| <u>Evolution</u> | 2 |
| Processes and Time Leading to the Existing Conditions | 2 |
| Anticipated Future Conditions | 4 |
| <u>Distinctive Units and Characteristics</u> | 5 |
| Endangered, Threatened and Protected Species. | 5 |
| Game Hunting. | 17 |
| Nongame Animal Data | 26 |
| Fisheries Data. | 29 |
| Other Areas of Interest | 30 |
| Cable Attacking Wildlife. | 32 |
| <u>Relationship to Other Data</u> | 33 |
| <u>Validity</u> | 34 |
| <u>Personnel Bibliography</u> | 36 |
| <u>Literature Bibliography</u> | 39 |
| <u>DATA MAP</u> | |
| Wildlife Data Map | 6 |
| <u>FIGURES</u> | |
| Figure 1. Timber Wolf Sightings and Assumed Range. | 8 |
| Figure 2. Fisher Release Sites and Change in Distribution | 10 |
| Figure 3. Marten Release Sites and Distribution | 11 |
| Figure 4. Moose Activity Centers and Sightings. | 12 |
| Figure 5. Distribution of the Greater Sandhill Crane | 16 |
| Figure 6. Great Lakes Fall Migration Corridors of Diving Ducks. | 21 |
| Figure 7. Great Lakes Fall Migration of Corridors of Canada Geese. | 23 |
| Figure 8. Proposed Development of Sturgeon River Slough. | 25 |

| | <u>PAGE</u> |
|---|-------------|
| Figure 9. Beaver and Otter Trapping Schedule, 1976 Season | 28 |

TABLES

| | |
|--|----|
| Table 1. Endangered, Threatened, or Reintroduced Species, or Species Whose Status Has Not Yet Been Determined. | 7 |
| Table 2. Endangered Birds in the Study Area | 14 |
| Table 3. Wildlife Floodings | 26 |
| Table 4. Game Hunting Schedule for the 1975-1976 Season | 27 |

APPENDICES

| | |
|---------------------------------------|----|
| Appendix A. Game Species. | 43 |
| Appendix B. Nongame Species | 47 |
| Appendix C. Fish. | 54 |

SUMMARY

The flora and fauna of the Study Area have undergone several periods of change since European man first entered the region. Early in this century large-scale logging and uncontrolled fires turned a climax forest vegetation type back to one representative of early successional stages. This change, together with uncontrolled hunting and trapping, resulted in the extirpation of a few species and a change in the relative composition of species towards those better adapted to open habitat. In recent years reforestation and fire protection have reversed this trend and the wildlife complex is changing accordingly. At least two of the extirpated mammals have been reintroduced and efforts are currently underway to protect and improve the habitat and status of six other threatened species of mammals, birds and fish.

Hunting and fishing are rapidly expanding forms of recreation in Michigan and promise to become increasingly important in the economy of the Study Area. The Michigan Department of Natural Resources in cooperation with the Forest Service is conducting an intensive program of habitat rehabilitation, fish planting, and wildlife development to capitalize on this new interest in outdoor activity.

EVOLUTION

Processes and Time Leading to the Existing Conditions

Within recent time a marked change has occurred in the animal complex of the Upper Peninsula. Most of this change is in some way related to man's activities. Clearcutting of forests, followed by burning, destroyed or temporarily altered many of the original terrestrial habitats and created new ones. Animals differ in their range of tolerance and in the degree they can continue to live in close proximity with man. Some species are restricted to specific habitat types, and when these are removed or altered to any substantial degree the animals disappear with them. When one type of habitat is destroyed, though, a new one is created. This may bring an entirely new species or complex of species into the area and those that are preadapted to the new habitat may occupy it and flourish.

Nearly all of the Upper Peninsula was once covered by a climax forest of hardwood interspersed with several important preclimax conifer forests. These pristine conditions were dramatically altered with the advent of the logging era at the turn of the century. Wildfires were probably never uncommon on the Upper Peninsula, but because of the mosaic-like distribution of vegetative cover and soil types they were also never very extensive. Large-scale clearcutting destroyed this natural pattern of firebreaks and allowed numerous large fires to sweep across the peninsula between 1920 and 1927, so that the changes wrought by the axe were intensified by the flame. Some animal species of the deep, unbroken woods like the pine marten, fisher and cougar disappeared completely, whereas a species like the coyote flourished with the extension of man into the forest. Others like the wolf and lynx were able to retreat before the timber cutter to the most inaccessible habitat possible, where a few remnant populations exist today. Some animals suffered serious depletion because they were valued for fur and meat or were reviled for their depredations. The elk is an extirpated species well adapted to a variety of habitats, but is hunted and is not compatible with human activity. The same is also true of the moose.

An opposite situation was created for many species associated with the earlier successional stages of vegetation. The creation of large, unbroken openings favored the white-tailed deer, ruffed grouse and sharp-tailed grouse. Animals that may have originally been entirely absent from the region, like the opossum, fox squirrel, thirteen-lined

ground squirrel, and eastern mole, moved in to fill newly established niches. Then in the late 1930s a major effort was made to reforest large areas of the Upper Peninsula. This, together with better fire control, has led to a reversion to a more climax type vegetation and a loss of habitat for animals of the early and middle successional stages. Thus, in response to a fluctuating environment, there is an ever-continuing fluctuation in animal types.

In some respects there have been changes and fluctuations in aquatic habitats that are as encompassing as those occurring on the land. The inland sport fishery of the Upper Peninsula has changed relatively little over time when it is compared other areas of Michigan. Fishing quality remains good and fishing pressures are probably below that which the area could support. But for Lake Superior and Lake Michigan, an opposite situation existed until a few years ago as the fishing quality of these large lakes declined drastically between 1940 and 1965. Then in 1966, the Great Lakes Fishery Commission and the Michigan Department of Natural Resources (DNR) began a major effort at rehabilitation with the introduction of salmonid species into the Lakes. Because these fish must spawn in tributary streams, the DNR decided to enhance the sport fishing potential of the inland water bodies as well as the Great Lakes, giving secondary priority to the restoration of commercial fishing. To appreciate the present close interrelationship between Lake Superior, Lake Michigan and inland fisheries and the concern for all the fisheries of the Upper Peninsula, it is necessary to know a little of the past history of the Great Lakes.

Thirty years ago Lakes Michigan and Superior supported a well-balanced and highly productive fish population composed of lake trout, burbot, whitefish, yellow perch, walleye and several species of chub, as well as smelt and other forage fish. Commercial fishermen annually caught 15 million pounds of lake trout alone. This fishery was upset by successive invasions of the sea lamprey and the alewife.

The lamprey has inhabited Lake Ontario since post-glacial times. The opening in 1829 of the Welland Canal gave the lamprey access to Lake Erie and the upper Great Lakes. By the end of the 1940s it had nearly destroyed lake trout and other predatory fish species in Lake Michigan. In the early 1950s the lamprey became well established in Lake Superior, again having a catastrophic effect. The alewife (a native to the Atlantic) was discovered in Lake Michigan in 1949 when the predator fish, which probably would have controlled it, were nearly gone. The alewife reached staggering abundance almost overnight, its proliferation seemingly unchecked

except by periodic die-offs which left windrows of rotting fish along Lake Michigan beaches.

A selective lamprey poison was developed in the late 1950s. This together with a lake trout restocking program permitted partial reattainment of a balanced fishery in both lakes. The abundance of the alewife required more than the restoration of lake trout, so the DNR introduced two anadromous salmonid species from the Pacific coast. The initial planting of young coho salmon in the Lakes' tributary waters occurred in 1966 followed by chinook salmon a year later.

Anticipated Future Conditions

The future status of the mammals and birds of the Upper Peninsula, particularly economically important species like deer and grouse, depends almost entirely upon the extent man is willing to indefinitely arrest the process of secondary forest succession, or selectively direct and control its progress. Under natural succession alone, the area can expect to experience a continued loss of open or semi-open habitat with a possible return of some of the climax species of woodland and forest. Some species like the cougar and the caribou are probably gone forever, but others may make a comeback if they are reintroduced and given protection. This is presently happening with the marten and fisher. Controlled hunting, trapping, and the use of pesticides will be particularly important for some endangered species, as will the establishment of a few wilderness or minimal-use areas.

There is less certainty about sport fishery in the Upper Peninsula. Its continued growth and importance will depend in part upon the continued success of the salmon program, which in turn will depend on overcoming other threats. Persistent use of pesticides is an immediate danger, and a longer-term danger is that the over-enrichment of Great Lake waters by phosphates and other nutrients will lead to accelerated eutrophication. Coho and other salmonid species may have difficulty surviving under eutrophic conditions. Finally, there is the uncertainty about the continued availability of a highly abundant forage fish. It is possible that the coho, chinook and lake trout, which have prospered since the decline of the lamprey, will succeed too well in reducing the alewife population.

DISTINCTIVE UNITS AND CHARACTERISTICS

Endangered, Threatened and Protected Species

Terminology used by the Michigan Department of Natural Resources (MDNR) differs slightly from that employed by the U. S. Department of Interior (USDI).

- (E) Endangered: in danger of being extirpated from all or a portion of its range (has the same meaning at both State and Federal levels).
- (T) Threatened: the Michigan portion of the species population is either on the verge of extirpation or is a relic population (MDNR equivalent of USDI "Rare").

Both terms signify a need for protection, but "endangered" implies the need is critical and immediate.

- (RI) Reintroduced: refers to species that were extirpated from Michigan but have been reintroduced. The status of these species is still tenuous and they should be treated with the same deference given the threatened or endangered species.
- (SU) Status Undetermined or Status Uncertain: designates a group for which precise information is lacking.

Mammals

Table 1 lists twelve species of mammals currently inhabiting the Study Area whose population's status is under scrutiny by federal or state biologists. Six species have been afforded complete protection by the Michigan Department of Natural Resources. Five additional species are believed to be limited in number and have been placed in an uncertain category. A sixth, the gray fox, also has uncertain status, but at this writing the DNR was considering dropping it from the list. The least chipmunk has been found to be in sufficient numbers to be no longer considered threatened.

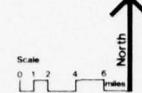
The timber wolf population in the Upper Peninsula is now estimated to be less than 50 individuals, scattered throughout the more remote areas. Figure 1 shows individual observations and assumed home ranges of the timber wolves. Five wolves were released on the grounds of the Huron Mountain Club in Marquette County. None of these wolves have survived and the project has been deemed a failure. The cause of the failure has been attributed to trapping, shooting and road kills.

Seafarer Site Survey Upper Michigan Region

by
EDAW inc.
San Francisco, California

under contract to
GTE Sylvan
Communication Systems Division
Needham Heights, Massachusetts

for
U.S. Navy
Naval Electronic Systems Command
Washington, D.C.



WILDLIFE

DEERYARD FOOD CONDITIONS

| | | | |
|--|---|--|--|
| | Moderate | | Heron Rookery |
| | Poor | | Sharp Tail Grouse Management Areas |
| | Single (S) or Multiple (M) Eagle Nest Sites | | Single (S) or Multiple (M) Osprey Nest Sites |
| | Lynx Sitings | | Wildlife Flooding Areas |
| | | | Other Areas of Interest (See Text) |

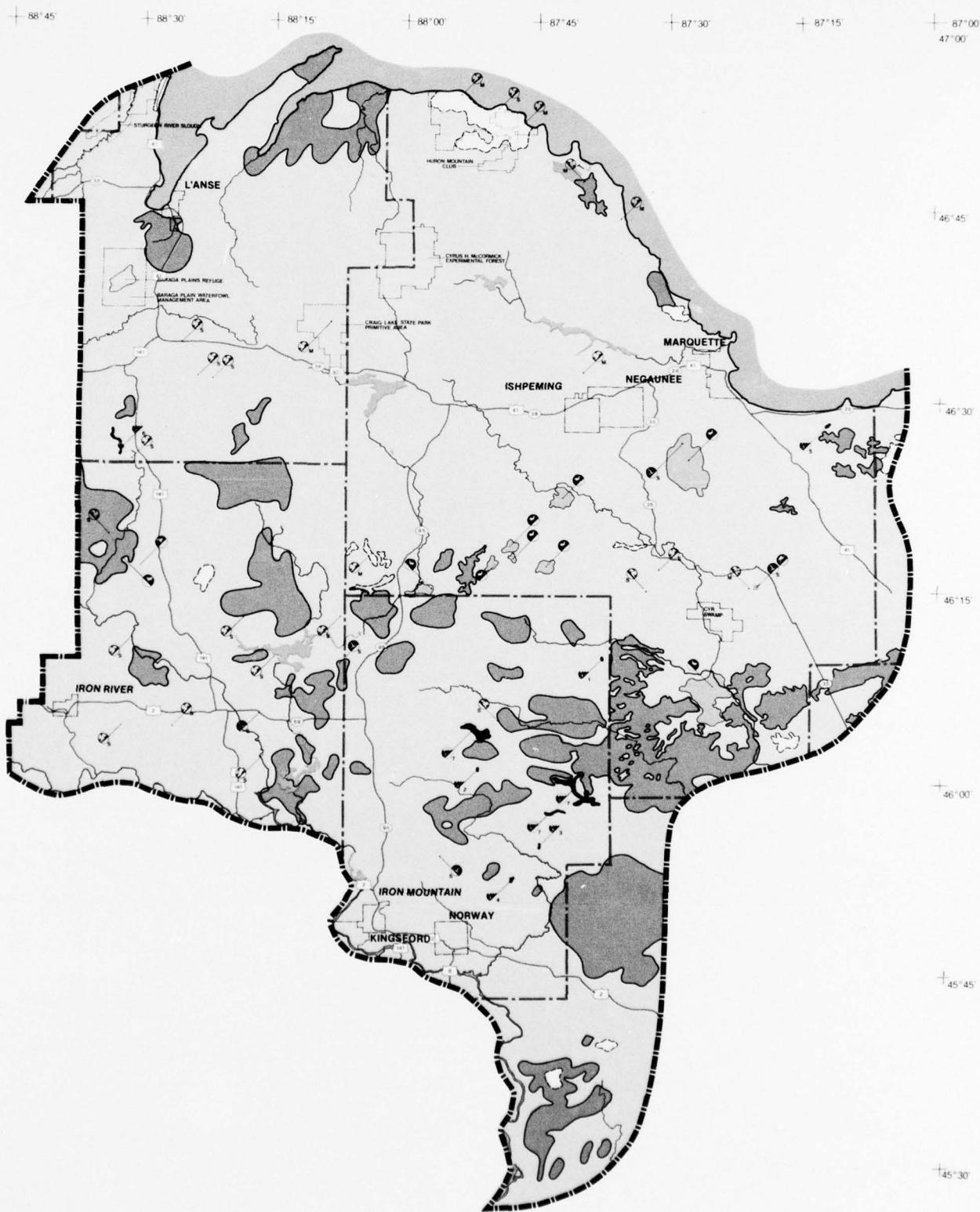


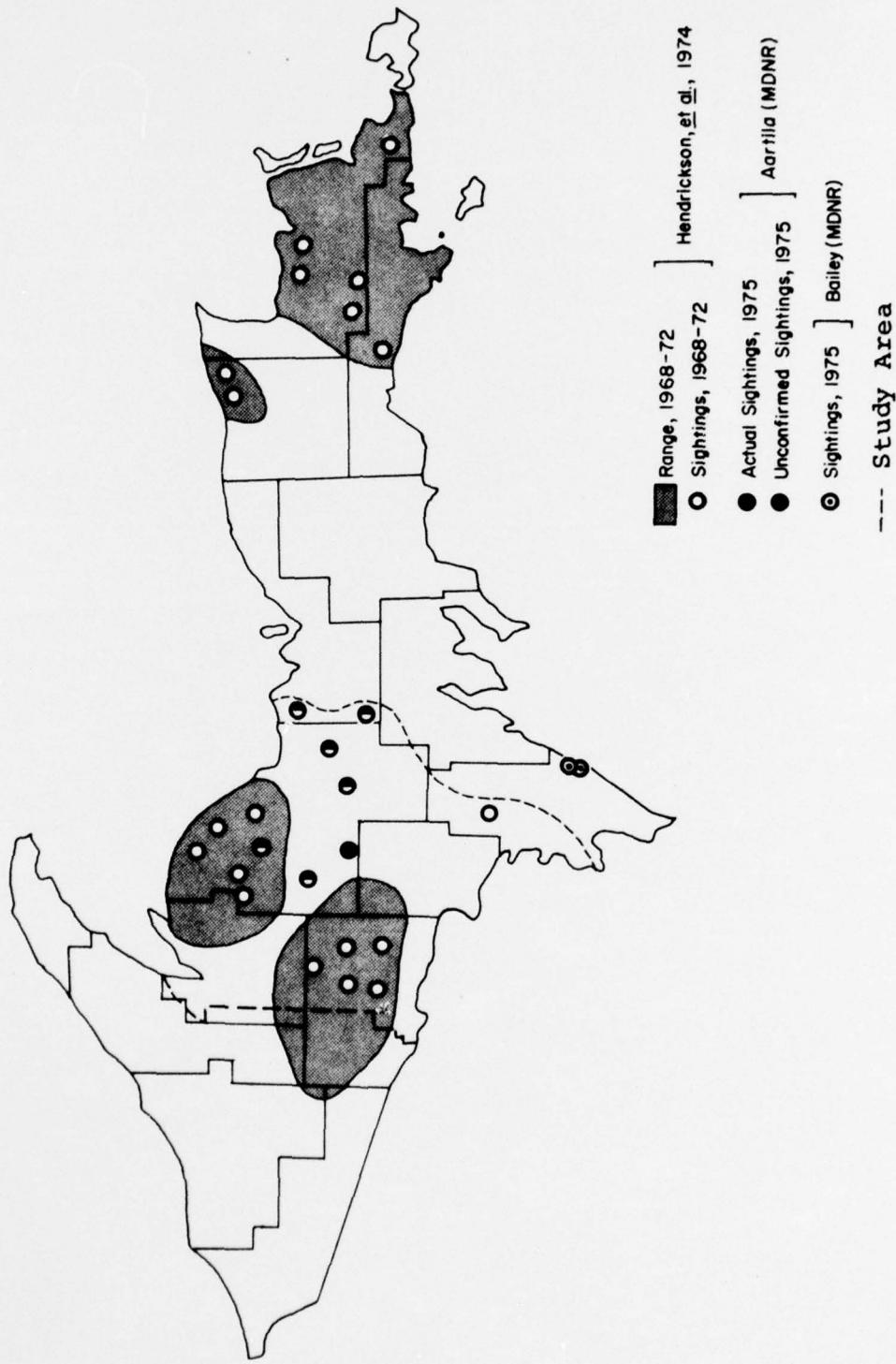
Table 1. ENDANGERED, THREATENED, OR REINTRODUCED
SPECIES, OR SPECIES WHOSE STATUS
HAS NOT YET BEEN DETERMINED

| Mammals | Status | |
|--|--------|-----|
| | USDI | DNR |
| *Eastern timber wolf (<u>Canis lupus lycaon</u>) | E | E |
| *Canada lynx (<u>Lynx c. canadensis</u>) | SU | SU |
| *Marten (<u>Martes a. americana</u>) | SU | T |
| *Fisher (<u>Martes p. pennanti</u>) | SU | RI |
| *Moose (<u>Alces alces americana</u>) | -- | SU |
| Gray fox (<u>Urocyon cinereoargenteus</u>) | -- | SU |
| *Southern bog lemming (<u>Synaptomeys cooperi</u>) | -- | T |
| Pigmy shrew (<u>Microsorex hoyi</u>) | -- | SU |
| Thompson's pigmy shrew (<u>Microsorex thompsoni</u>) | -- | SU |
| Arctic shrew (<u>Sorex arcticus</u>) | -- | SU |
| Water shrew (<u>Sorex paustris</u>) | -- | SU |
| Eastern pipistrelle (<u>Pipistrellus subflavus</u>) | -- | SU |

* Completely protected under DNR law

Source: F. W. Stuewer, Michigan Department of
Natural Resources

FIGURE 1 TIMBER WOLF SIGHTINGS AND ASSUMED RANGE



The Canada lynx, like the wolf, will benefit anytime that trapping for coyote is restricted and wilderness areas are established. There are no available estimates of total number, but the occasional kills that have been reported over the last five or six years indicate an established breeding population scattered over the entire Upper Peninsula. The DNR currently has no projects planned specifically for lynx other than the promotion of wilderness areas and restricting land use on lynx range.

Originally the pine marten and fisher were moderately abundant on the Upper Peninsula, yet by 1935 trapping and logging had completely exterminated them. The fisher was reintroduced on the Ottawa National Forest in 1961. It took several years for the species to become locally adjusted, but since 1970 there has been a significant eastward extension of their range (Figure 2). Today it is considered an established species and there is a possibility of its occurrence anywhere in the Study Area where there are densely wooded areas.

Early efforts to reintroduce the pine marten were not as successful. A second attempt was made in the winters of 1968 and 1969. A total of 99 martens have been released in Delta County just to the east of the Study Area. They are believed to be expanding their range both to the east and west and at present may be beyond that shown in Figure 3. Several recent sightings and trapping of unmarked individuals indicate the production of young by some of the released females, however, the marten population contains so few numbers it is given threatened status.

Despite legal protection given the moose in 1899, it has continued to decline with only 25 to 50 animals still remaining on the Upper Peninsula. There are less than half this number in the Study Area. An attempt to bolster the population by introducing 71 Isle Royale moose in the mid-1930s was unsuccessful. Lack of research on the moose is the basis for continued uncertainty as to its status or future. It should be affected less by vegetation changes than many other species. Although an inhabitant of coniferous forests, it can utilize a variety of forage species and prosper in areas with both early and late stages of plant succession. The fact that it has not is attributed to incompatibility with human activity. Final judgment, however, awaits better understanding of its life cycle, its relationship to other large herbivores, and the extent to which diseases transmitted by deer may tend to suppress population growth. Moose activity centers and sightings are shown in Figure 4.

FIGURE 2 FISHER RELEASE SITES AND CHANGE IN DISTRIBUTION

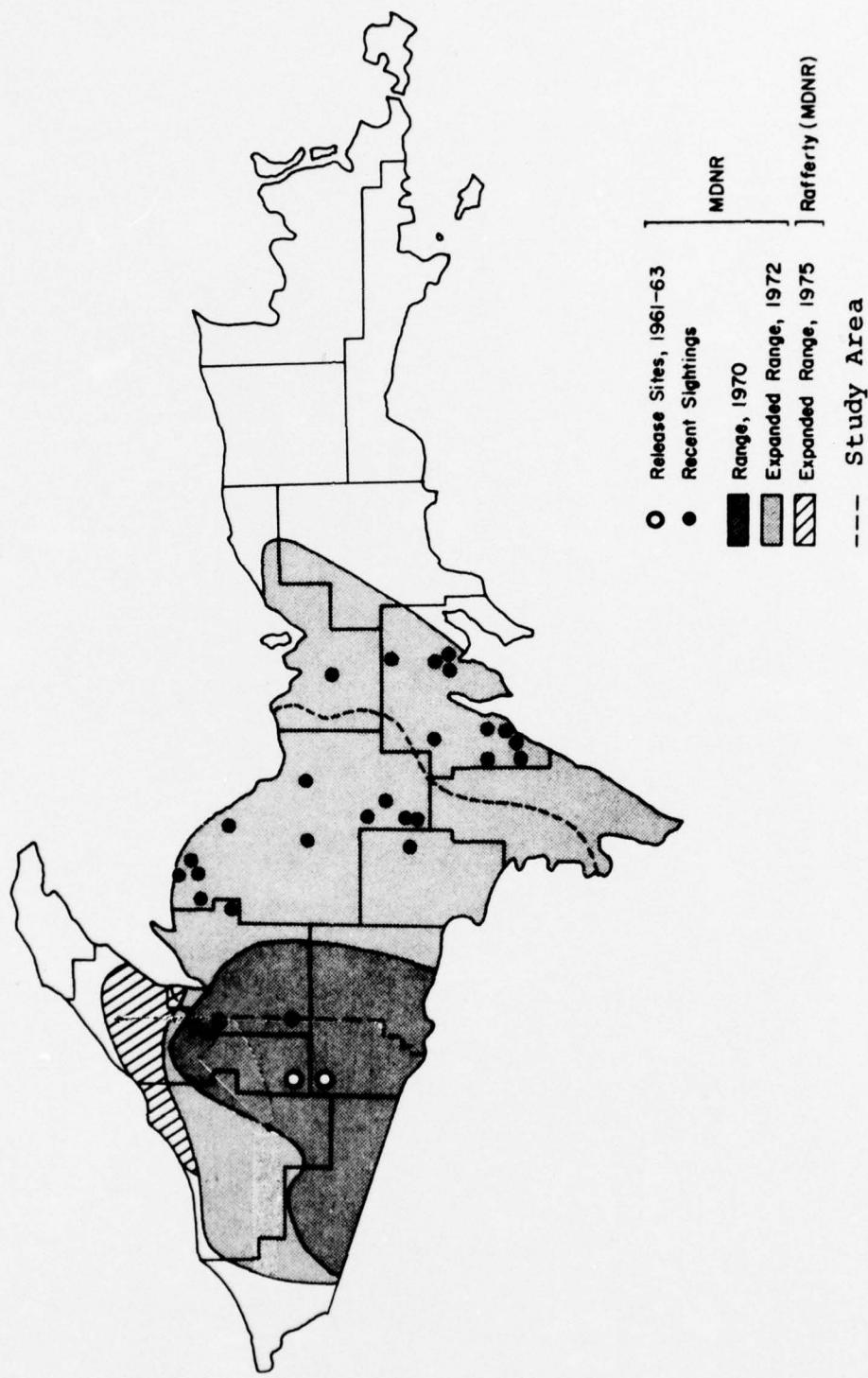


FIGURE 3 MARTEN RELEASE SITES AND DISTRIBUTION

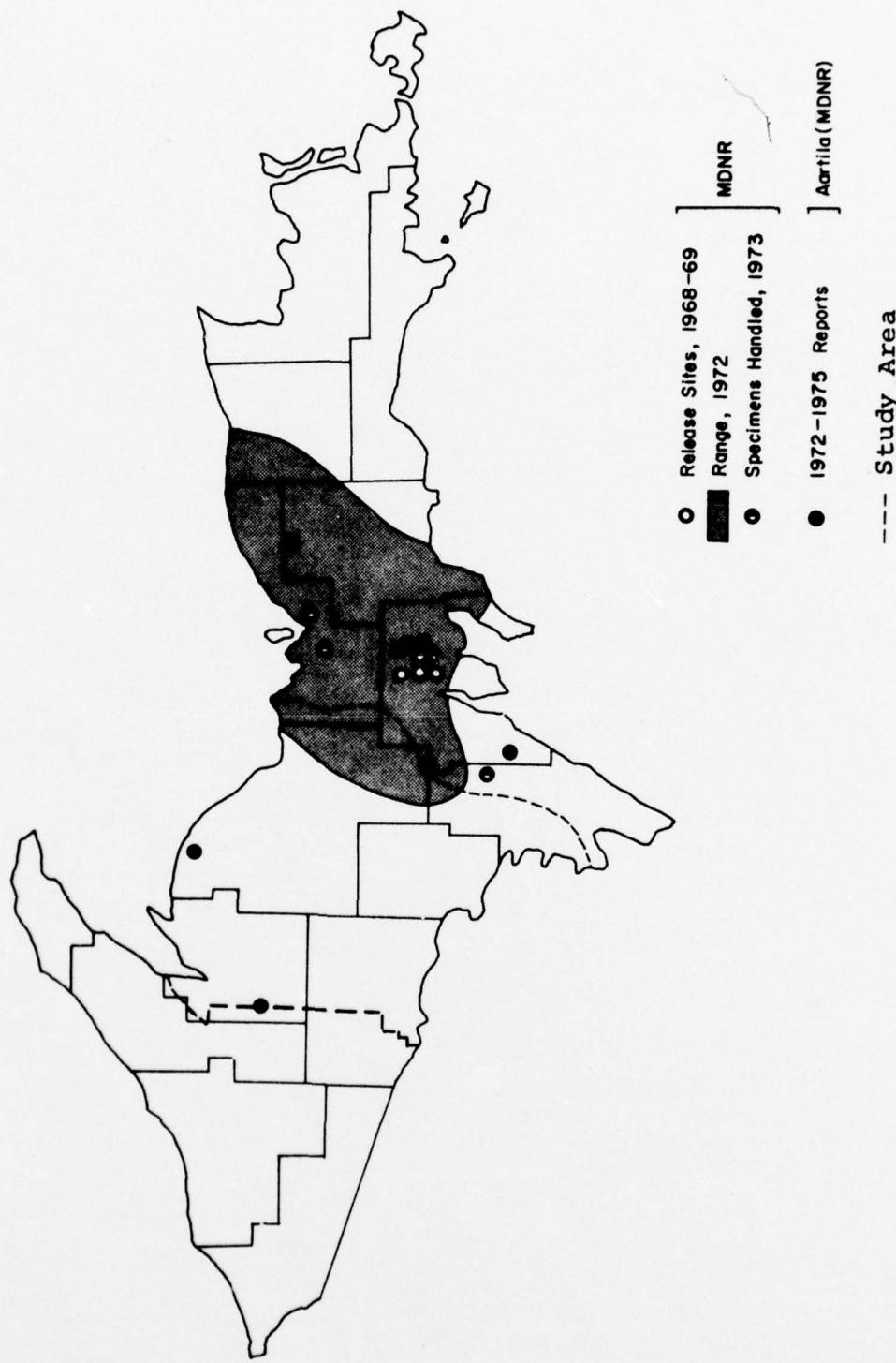
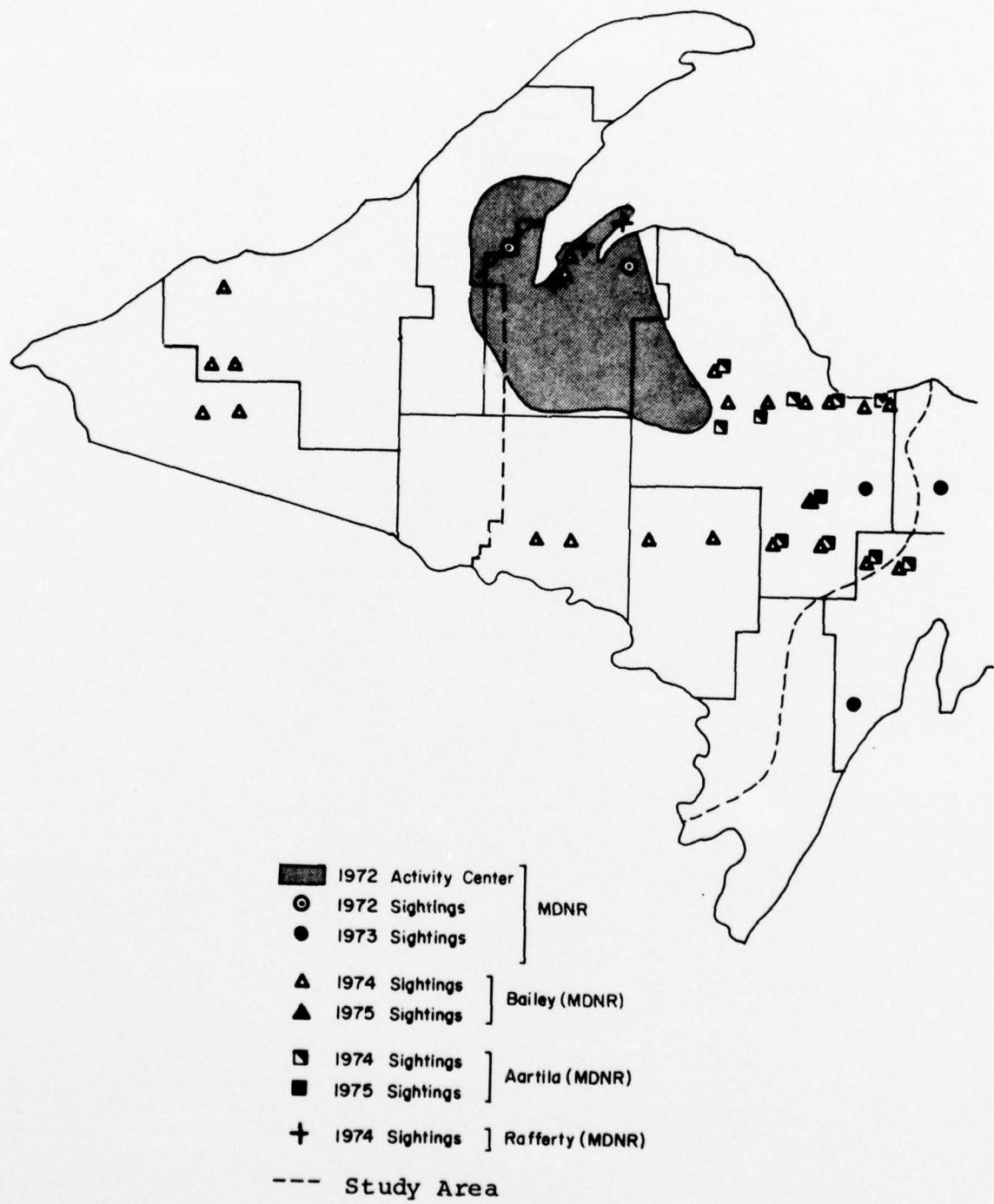


FIGURE 4 MOOSE ACTIVITY CENTERS AND SIGHTINGS



The remaining six species of mammals listed in Table 1 are thought to be limited in number within the State of Michigan. In the Study Area, they may be locally abundant. For example, within the McCormick Forest all but the water shrew are fairly common. This would undoubtedly be true in other selected areas.

Birds

There are three species of birds which may be found in the Study Area that are considered endangered by the DNR: the peregrine falcon (Falco peregrinus), an occasional visitor; the American osprey (Pandion haliaetus) and the northern bald eagle (Haliaeetus leucocephalus alascanus), both of which nest in the Study Area.

Seven other bird species are listed as threatened by the DNR and are listed in Table 2. None of these bird species are currently listed by the USDI.

While the peregrine falcon is not known to nest in the Study Area, the possibility exists that these birds may pass through on their limited migration flights. These flights would occur in early spring (March or April) while the birds are migrating to the northern reach of Canada for nesting or in the fall during their migrations south. The flight paths will generally follow the Lake Superior coastline in the Study Area. These birds are extremely sensitive to disturbance in their nesting eyries, and may abandon a nest after being molested. Should a peregrine falcon nest be observed, the same regulations would apply to it as apply to bald eagle nests, American osprey nests, and heron rookery. The DNR prohibits snowmobiles, timber harvest, construction, and other human activities from approaching within one mile to 1/2 mile of the nest. This exclusion zone is enforced only during the nesting period which runs from January to August.

The osprey is a migratory bird. A few individuals begin arriving at the nesting sites in mid-March, with males preceding females. The main group appears in April. Arrival date may vary by a few weeks and is probably conditioned by the movements of the fish on which they prey. Eagles may nest as early as March 1. Although not considered by local authorities to be migratory, the Bald Eagle is generally absent from the nest sites from mid-December until March. The Wildlife Data Map shows nest sites known to be available through the fall and spring of 1972 and 1973. Not all are currently occupied. If a nest is not destroyed beyond repair during the winter there is a high probability that the same pair will occupy it again the succeeding spring.

Table 2. ENDANGERED BIRDS IN THE STUDY AREA

| Birds | Status | |
|---|--------|-----------|
| | USDI | MDNR |
| Peregrine falcon (<u>Falco peregrinus</u>) | E | E (O.V.)* |
| Double-crested cormorant (<u>Phalacrocorax auritus</u>) | - | T |
| Cooper's hawk (<u>Accipiter cooperii</u>) | - | T |
| Red-shouldered hawk (<u>Buteo lineatus</u>) | - | T |
| Marsh hawk (<u>Circus cyaneus</u>) | - | T |
| Osprey (<u>Pandion haliaetus</u>) | - | T |
| Bald eagle (<u>Haliaeetus leucocephalus</u>) | E | T |
| Piping plover (<u>Charadrius melanotos</u>) | - | T (O.V.)* |
| Loggerhead shrike (<u>Lanius ludovicianus</u>) | - | T |
| Barn owl (<u>Tyto alba</u>) | - | T |

*O.V.: Occasional visitor

Source: F. W. Stuewer, Michigan Department of
Natural Resources

Nests are seldom, if ever, built on the ground. The best estimate of population size for the two species combined is 80 breeding pairs plus a few nonmated birds. Eggs start to hatch around mid-May and the young are found in the nest as late as August. The critical nest building, incubation, and developmental period for the young lasts about 15 weeks, generally from April through July. During the forepart of this period the DNR closes all roads in the vicinity of a nest site to snowmobiles. Private land owners are also beginning to do the same. The eagle and the osprey are moderately tolerant of human presence, but appear susceptible to sustained periods of high activity or to high noise levels, especially within 1/4 to 3/4 miles of the nest. The closeness with which nests may be approached depends on direction. These birds are most sensitive to activity that ensues between the nest and their line of flight to the nearest water body or accustomed feeding area.

In the recent past the habitat of the greater sandhill crane has been restricted to the eastern part of the Upper Peninsula and the south central part of the Lower Peninsula. Within this habitat it is doing very well. There are an estimated 500 to 600 birds on the Upper Peninsula, and only recently have they started to expand their nesting range into the eastern edge of the Study Area (Figure 5). The greater sandhill crane is an extremely shy bird and will abandon its nest if there is human activity in a nearby area.

Reptiles and Amphibians

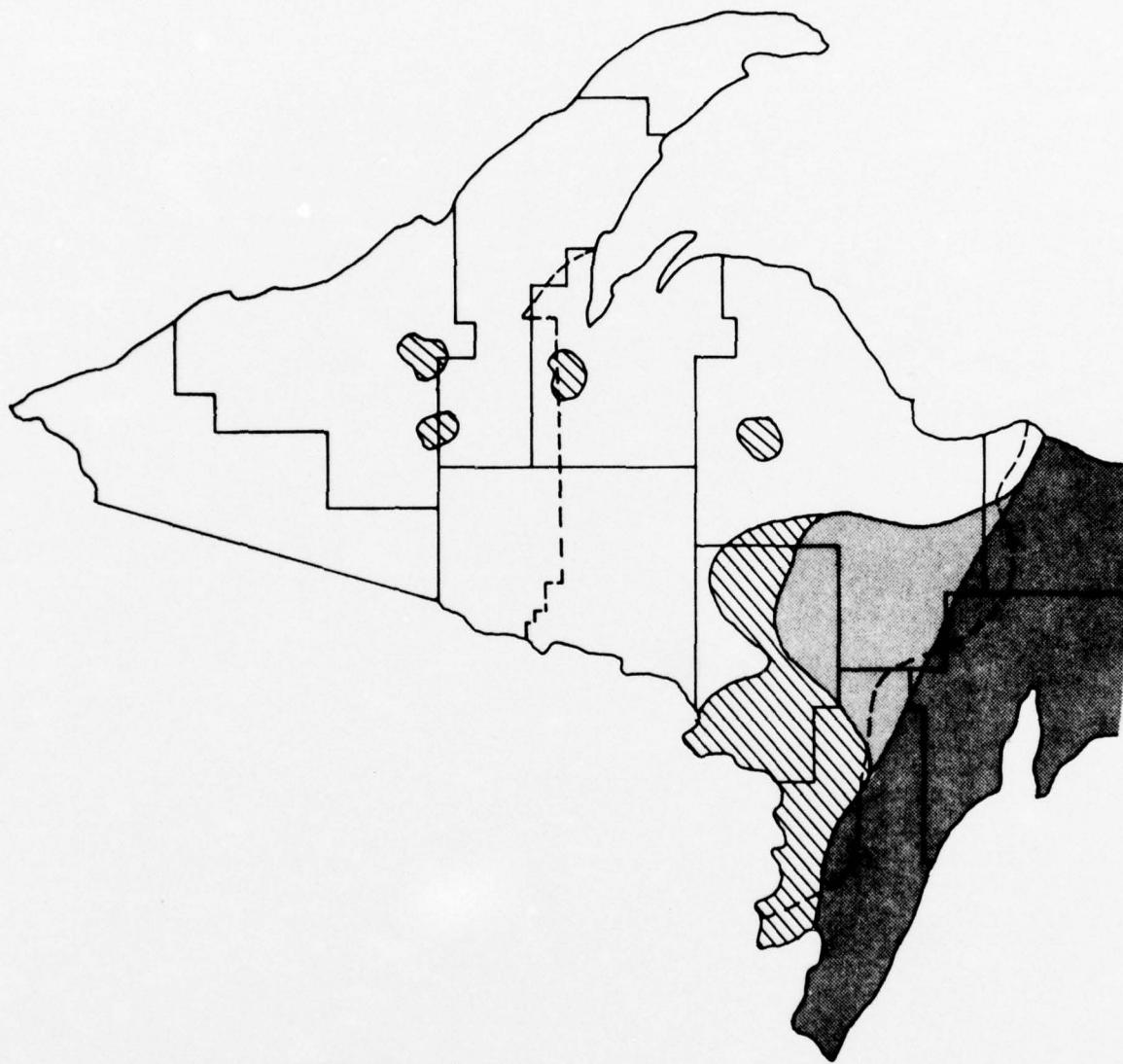
There are no data on the population size of the Lake Winnebago mudpuppy and it is therefore classified as "status underdetermined." The four-toed salamander (Hemidactylum scutatum) is restricted to northern bog-type habitats and is therefore considered rare throughout the range. Many of the other herptile species are at the limits of their range in the Study Area and are expected to have limited populations. There are no endangered reptile species in the Study Area.

Fish

The USDI has classified one fish within the Study Area as rare, the lake sturgeon (Acipenser fulvescens).

The Lake Sturgeon population has been reduced indirectly by commercial fishing. Dams that have blocked its run up rivers to spawning areas, plus predation by the lamprey, have kept the population depressed. It would probably reproduce in most rivers in the Study Area if it were not for

FIGURE 5 DISTRIBUTION OF THE GREATER SANDHILL CRANE



Distribution as of:

- January 1972, MDNR
- ▨ November 1973, Taylor (USFS)
- ▨ Fall 1975, Taylor (USFS)
- Study Area

its stringent habitat requirements that effectively limit the number of suitable spawning areas. In the Study Area there is a resident population in the Menominee River (above the first dam). Some sturgeon also run up the Sturgeon River from Lake Superior to just below Prickett Dam.

Game Hunting

All species legally designated as game animals or furbearers, including those species for which there is no open trapping or shooting season, but excluding rare, endangered or protected species are listed in Appendix A.

Game Mammals

The whitetailed deer is the most important game species on the Upper Peninsula in terms of dollar investment by the sportsman and dollar income to the local residents. But in recent years populations have been declining significantly. Large winter die-offs are becoming common, basically because the abundant natural browse resulting from heavy logging 40 or 50 years ago has grown out of reach of the animals while understory vegetation has become much more sparse as second growth forests mature.

Deer compound their own problem, particularly during the critical winter months, by congregating in small areas called "yards." The location of some of the yards will shift over time, but unless there are significant changes in the type of land usage in or near a yarding area they will continue to be utilized by deer for many years. The Wildlife Data Map shows all the known deer yards. The food conditions for each yard are designated as medium or poor. Poor means there will be deer dieoff in severe winters; medium means there will be a dieoff when there are successive severe winters. This is a qualitative classification that is relative to the number of deer that an area must support for the winter period. Since deer density varies from area to area, so does the actual quantity of forage that a yard can supply. Ordinarily deer will begin to move into the yards between mid-November and mid-December and are completely yarded by January 1. Spring breakup normally occurs in early April, so that deer are yarded for at least 100 days. In summer the deer range as far as 20 to 25 miles from the winter yards.

Deer apparently yard to gain physical comfort and respite from the deep snow and cold winds that penetrate the more open brushy and mainly deciduous shrub and tree areas that are their foraging grounds during the nonwinter months.

Whether by instinct or experience, they consistently choose sites which effectively moderate rigorous climate but which frequently lack the plentiful browse of nearby but unused areas. These yards can quickly become browsed-out and if the winter is particularly hard or long, there may be mass starvation and die-off.

In 1970 the DNR was given the authority by the Natural Resources Commission to manage all of the state forest land so as to produce not only timber but wildlife as well. One of the first concerns of the DNR has been to bring as many yards as possible under intensive management. Their program calls for rehabilitating those yards presently supporting sizable populations of deer before attempting to restore vacant range. To do this they are: (1) cutting noncommercial timber to open up stands for increased understory growth, (2) contracting for winter logging so that slash becomes available to the deer, (3) purchasing private land adjacent to deer yards in hope of reducing deer population densities within the yard. The DNR takes great care in selecting where and when they do rehabilitation cutting. They want to avoid luring deer into an area with only a limited amount of food material and leaving them stranded for the remainder of the winter.

Deer yards are usually centered around a group of conifers such as hemlock, white cedar, or balsam fir. In the eastern half of the Upper Peninsula white cedar swamps are most frequently used as deer yards. Because of the protection they afford and their value as winter browse, other conifers are utilized to some extent, particularly in the western counties where white cedar is uncommon. In portions of Baraga and Houghton Counties, the yards are in upland cover such as hemlock or balsam fir. As the uplands are deteriorating through overbrowsing and fluctuating water tables, the deer yards are deteriorating. In these two Counties not only are the deer yards sliding toward poorer conditions, but they are also suffering a slight decrease in acreage. The total acreage of deer yards in Marquette County is also decreasing. Iron, Dickinson, and Menominee Counties contain white cedar swamps which are utilized by the deer as winter cover, but because of regeneration difficulties the white cedar deer yards are going from moderate to poor or from poor to poorer condition. However, in these Counties, the district biologist of DNR has noted that as the condition of the yard decreases, the acreages often increase, as the deer are forced to expand their search for winter food.

At present the DNR does not have a silvicultural system applicable to all yarding areas or forest types. The system

receiving the most attention is the experiment in the swamp conifer forest on the Cusino Wildlife Research Station in Alger County. In brief, it designates a minimal area of 200 acres as a cutting compartment. The compartment is then divided into four or five units and each unit is cut on a rotational cycle that extends over a 20 to 100 year period. This produces five age classes within a compartment, with a differential of 20 years between units.

The clear cutting of a single 40-acre unit might extend over a 5- or 10-year period because the cutting would be done in alternate strips of 50 to 75 feet width and of varying length. The amount that would have to be cut each winter will vary with the deer density in a given area. If the deer density is extremely heavy, for example, 65 deer per 200 acre compartment, it would take approximately five acres of slash to provide for the herd during one winter.

The black bear provides the only other big game hunting in the Upper Peninsula. In terms of the number of hunters who go after bear, it has become an increasingly important species over the last 10 years. Average annual kill ranges between 550 to 850 animals. Small game mammal hunting is provided by the red squirrel, gray squirrel, snowshoe hare, and the eastern cottontail. All but the snowshoe hare are in relatively low density in the Study Area.

Game Birds

The spruce grouse is a forest species more often associated with jack pine bog areas or other short-needle conifers than with spruce. A native to Michigan, once fairly common, it was considerably reduced by the turn of the century and since 1914 all hunting has been discontinued. There is little evidence of significant population changes in the past 40 years because its specialized habitat type remains limited. Thus this grouse remains limited but stable, and is afforded complete protection.

Another native of Michigan is the ruffed grouse, found throughout the Upper Peninsula. Although it thrives in the intermediate stages of plant succession, its habitat type is not as limited as that of the spruce grouse and it has been able to maintain its position as the most popular and widely hunted upland game bird in the Study Area. The ruffed grouse is subjected to population fluctuations of biological origin. A cyclic peak was expected toward the end of the 1960s; instead, the lowest numbers since the mid-fifties were recorded in 1968 and 1969. Since then the population trend has been upward.

The sharp-tailed grouse is not native to the Upper Peninsula. It came into the area from Wisconsin in the early 1900s after timber cutting and extensive burning. Within 30 years they reached a peak of abundance and distribution. By the mid-fifties the sharp-tailed grouse were declining everywhere in the Study Area as the reforested areas became too dense for suitable habitat. Presently, only a few small isolated colonies remain and hunting is limited to a three week season in five counties, down from ten counties in 1968.

The black grouse (*Lyrurus tetrix*) is a native of the forested regions of northern Europe and central Asia. They are nonmigratory, social birds, often gathering in large flocks over winter. They prefer open, mixed woodlands, brushlands, and woody and aquatic ecotones. The birds were released in Dickinson County in December, 1974, and have been observed at least 18 times since their release. They have been given complete legal protection until at least April 11, 1979.

None of the three remaining resident game birds provide significant hunting in the Study Area. The turkey and pheasant are not native to the Upper Peninsula but both have been introduced into Menominee County. As yet only the pheasant is sufficiently numerous to permit limited hunting. Until last year the crow was one of three Michigan birds for which there was no legal protection. Now crow hunting is regulated by the Department of Natural Resources with an established open and closed season.

Wetland Game

The species in this category are classified as migratory and therefore come under federal protection and hunting regulation. The State of Michigan may reduce the length of the hunting season, or eliminate it, but it cannot establish or extend a season beyond federal limits.

o Waterfowl

The Upper Peninsula lies within the area where the western edge of the Atlantic flyway overlaps the Mississippi flyway. Two western corridors of the Atlantic flyway cross the Upper Peninsula from Northwest to Southeast. This is a general route taken by diving ducks such as the canvasback, redhead, and scaups that come from the great interior breeding grounds of Canada. Each corridor averages 26,000 to 75,000 birds annually and is shown in Figure 6.

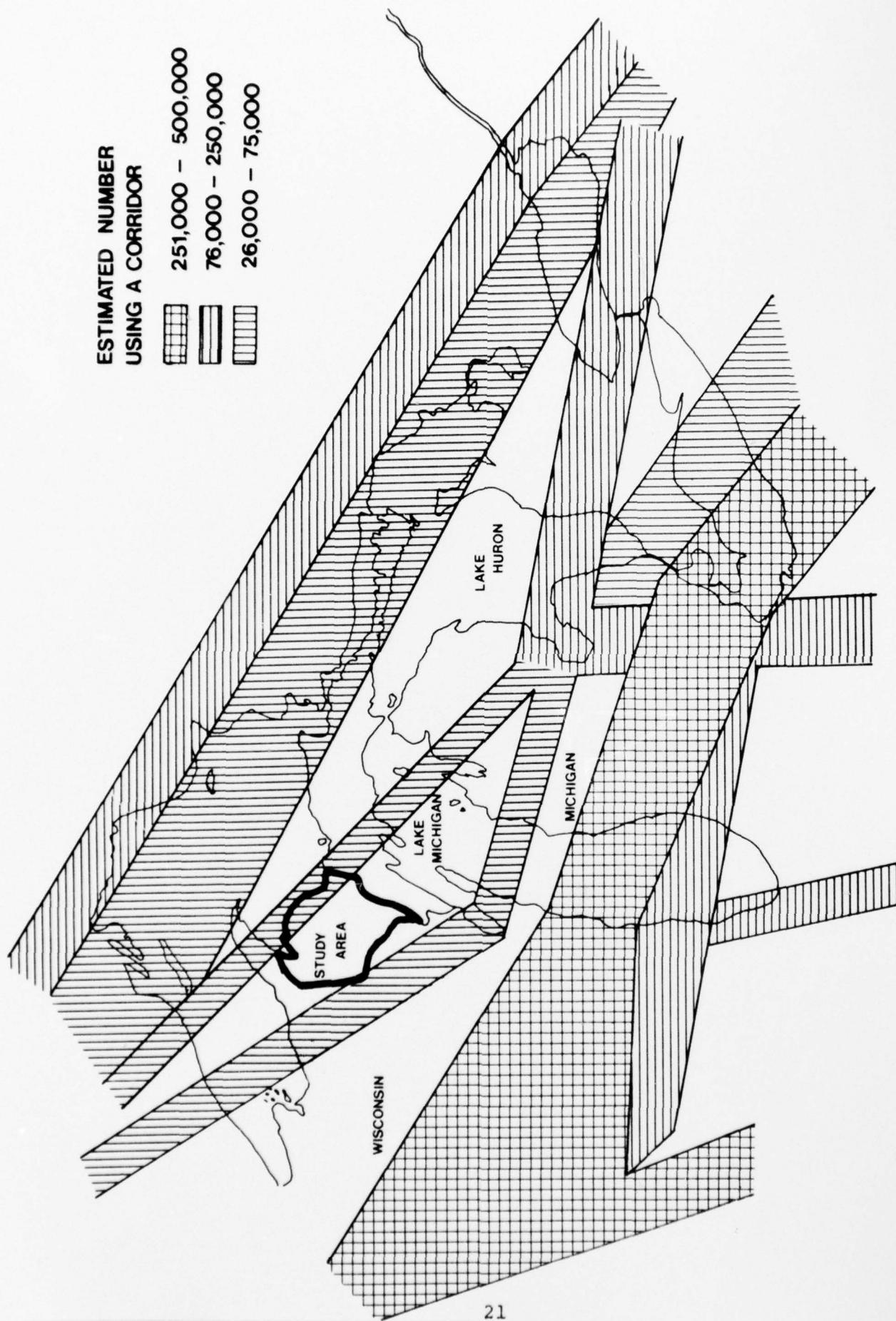


Figure 6. GREAT LAKES FALL MIGRATION CORRIDORS OF DIVING DUCKS
(Adapted from Bellrose Waterfowl Migration Corridors, 1968)

The Mississippi flyway provides most of the other waterfowl listed in Appendix A. Most of the dabbling ducks use it regularly and even the brant and the European widgeon find their way into the Study Area occasionally. It also accommodates three separate populations of Canada geese. The largest is the Mississippi Valley population, which originates west of James Bay and migrates south through Ontario. The two corridors within this route that extend over the Study Area are shown in Figure 7. Seasonal Canada goose concentrations are heavy. An estimated 25,000 to 75,000 birds use the western corridor and another 75,000 to 100,000 make use of the eastern corridor.

In addition to the migratory individuals coming from breeding grounds far to the north, there are 12 to 15 species known to nest locally. The most common nesting group is the dabblers of which the mallard, wood duck, blue-winged teal and black duck are the most abundant. One diving duck, the ring-necked, breeds in considerable numbers in the eastern part of the Upper Peninsula and to a lesser extent in the Study Area. Two other diving ducks known to breed locally are the goldeneye and the bufflehead.

Waterfowl hunting figures fluctuate widely from year to year, but generally 20 to 25 percent of the geese taken by hunters in Michigan come from the Upper Peninsula. More important is the fact that the total kill per total number of hunters is consistently higher here than in other parts of the state. Roughly ten percent of the annual duck kill is in the Upper Peninsula. Both the USFS and the DNR believe these figures to be considerably below the potential for the area and have therefore started a program of waterfowl development projects designed to entice more birds and more hunters into the region.

o Waterfowl Projects

Initial emphasis is being given to improving and expanding geese habitat. Long-range objectives are (1) increase the size of resident breeding flocks, and (2) establish a use tradition among migrating geese to assure a yearly stopover of birds currently bypassing the Upper Peninsula and flying on to over-crowded refuges in southern Michigan and Wisconsin.

To accomplish these objectives the USFS and the DNR have established or are proposing to establish two

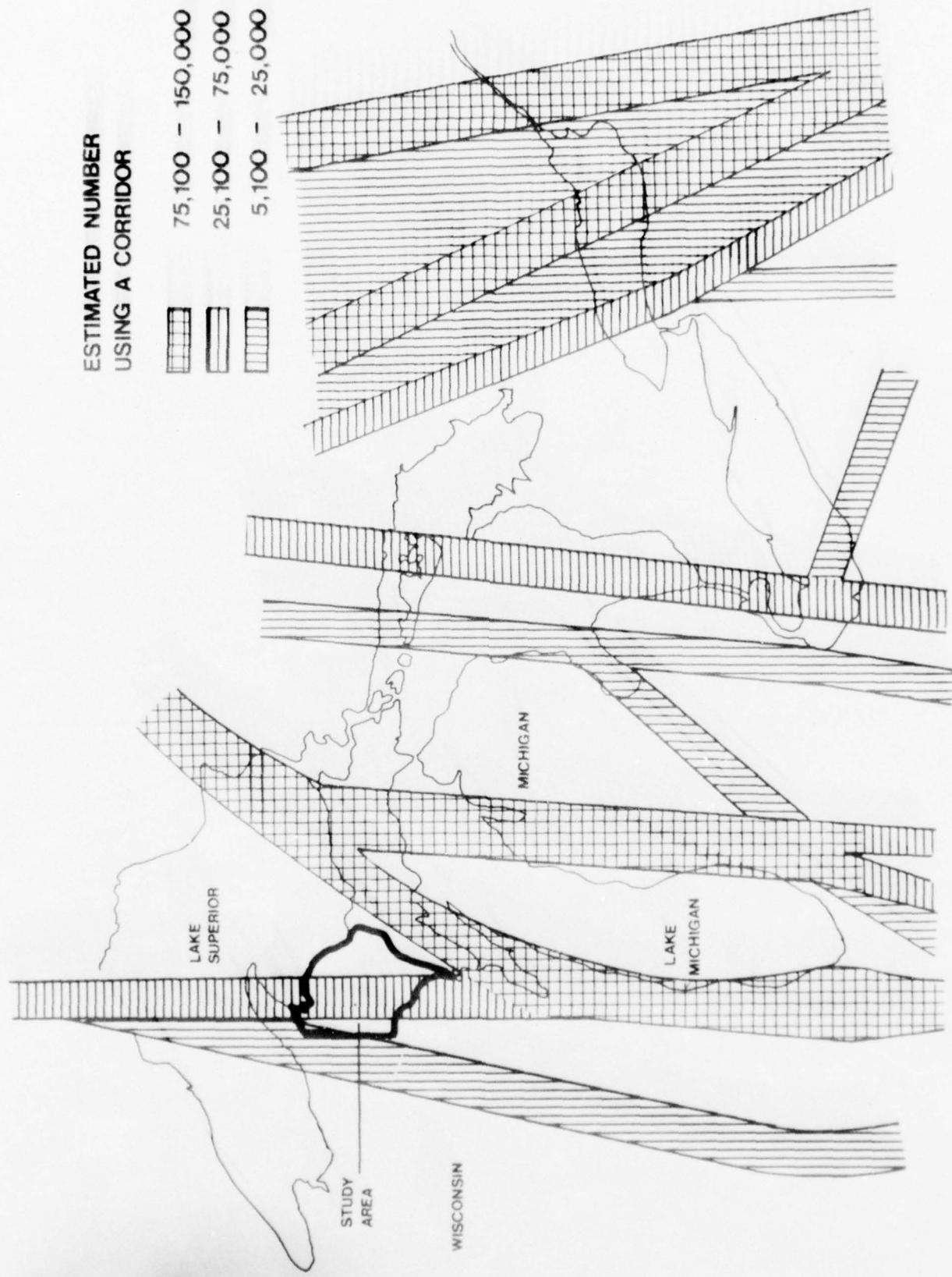


Figure 7. GREAT LAKES FALL MIGRATION OF CORRIDORS OF CANADA GEESE.
(Adapted from Bellrose Waterfowl Migration Corridors 1968)

waterfowl projects in the Study Area. These are shown on the Wildlife Data Map; additional details are shown in Appendix B (Figures 3B to 5B), and a brief synopsis is given below.

Baraga Plains Waterfowl Project

The Baraga Plains waterfowl management area surrounds the Baraga Plains refuge, and lies within the Baraga State Forest. The refuge contains 1,500 acres, is closed to entry from September 15 through November 1 and is closed to hunting all year long.

The management area encompasses 12 square miles. Development has proceeded to clearing land and planting food plants for geese. In April, 1973, the first attempt was made to establish twelve pairs of breeding Canada geese, with more released in 1974. Nesting sandhill cranes have also been observed in the area. Some 5,000 geese use the area during fall and 36 geese are permanent residents. Hunting is open in the management area, but is not allowed in the refuge (see Wildlife Data Map).

Sturgeon River Sloughs Waterfowl Project (DNR)

Now under construction, this waterfowl project encompasses eight thousand acres in Houghton and Baraga Counties. Eight pairs of breeding Canada Geese have been released. This area is open for hunting (see Figure 8).

Cyr Swamp

Although Cyr Swamp has been abandoned as a waterfowl management area because of its proximity to a U. S. Air Force Base, the state will retain possession of the land.

o Wildlife Floodings

In addition to the waterfowl projects, the DNR is flooding a number of small areas to provide more habitat for all wetland game species, both resident and migratory. The hope is to offset loss of this habitat type in other areas where industrial and residential development have necessitated the draining, dredging and filling of many former wetland wildlife areas. Wildlife floodings within the Study Area are shown on the Wildlife Data Map. The sizes of these floodings are given in Table 3.

STURGEON RIVER SLOUGH

scale
0 1 mile

N

- Dike
- Pumping Station
- (1) Unit Number

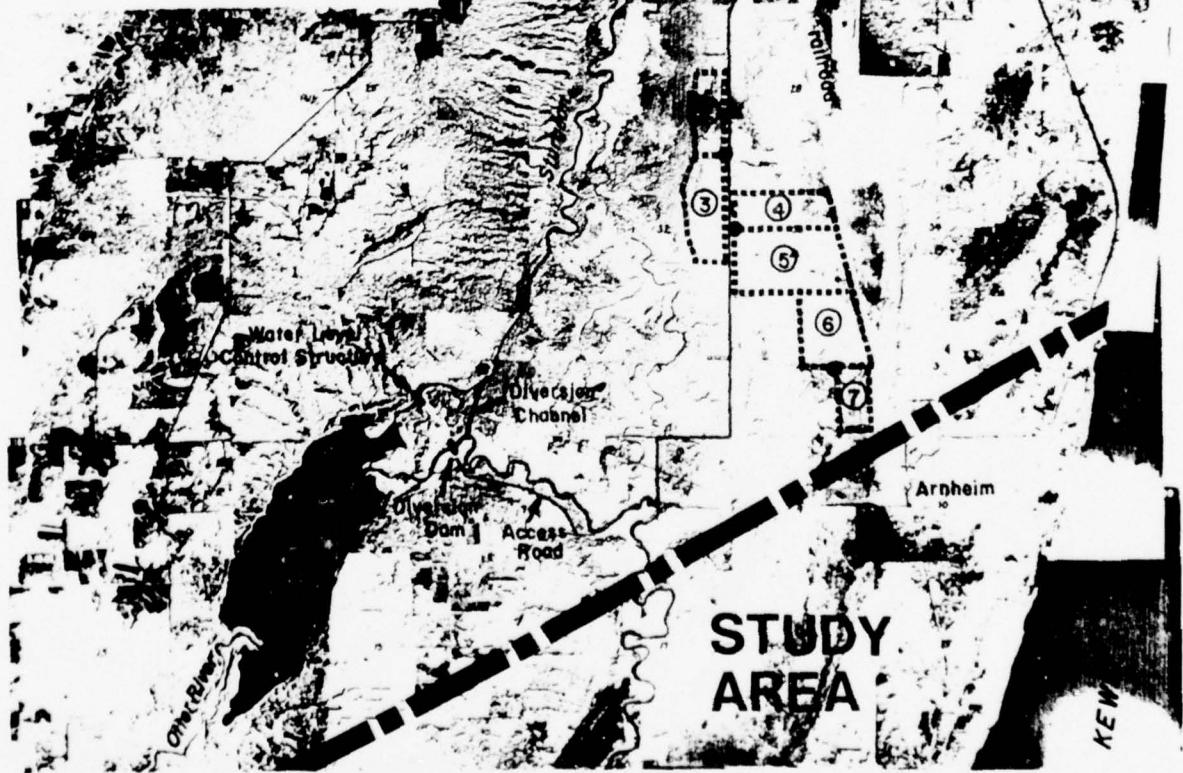


Figure 8. PROPOSED DEVELOPMENT OF STURGEON RIVER SLOUGH

Table 3. WILDLIFE FLOODINGS

| <u>Map No.</u> | <u>Name and County</u> | <u>Size (Acres)</u> |
|----------------|--------------------------------------|---------------------|
| 1 | Lake 36, Dickinson County | 93 |
| 2 | Felch Mountain, Dickinson County | 40 |
| 3 | Hancock Creek, Dickinson County | 74 |
| 4 | Bloomgreen's Marsh, Dickinson County | 75 |
| 5 | Mud Lake, Marquette County | 190 |
| 6 | Net River, Baraga County | 210 |
| 7 | Sturgeon River, Dickinson County | 2,029 |

Source: G. F. Martz, Department of Natural Resources

o Shorebirds and Marshbirds

Woodcock and jacksnipe both flourish on the Upper Peninsula, but only the woodcock is popular with hunters. Since federal regulations were revised in 1968, permitting a lengthening of the woodcock season so it could coincide with the ruffed grouse season, hunter kill has increased each year. In 1972 it was nearly three times what it was in 1968 with no apparent ill effects on the population as a whole. Rails, coot and the common gallinule provide hunting for a select few, but they rank low on the list of important game species.

o Hunting Schedule See Table 4 and Figure 9.

Nongame Animal Data (Excluding Fish)

See Appendix B for a listing of nongame animals located in the Study Area.

Table 4. GAME HUNTING SCHEDULE
FOR THE 1975-1976 SEASON

| Species | Dates of Open Season (See Validity) |
|---------------------------------------|--|
| Deer, White-tailed | Archery |
| | Firearm |
| Bear, Black | Archery |
| | Firearm |
| Rabbit, Cottontail; Hare, Snowshoe | Oct. 1 - Mar. 31 |
| Squirrel, Gray | Sep. 15 - Nov. 10 |
| Mink | Oct. 25 - Dec. 31 |
| Raccoon | Oct. 1 - Jan. 31 |
| Pheasant, Ring-necked (a) | Oct. 10 - Oct. 20 |
| Grouse, Ruffed; Woodcock | Sep. 15 - Nov. 13 |
| Grouse, Sharptail (b) | Oct. 1 - Oct. 20 |
| Crow | Jul. 15 - Sep. 30 |
| Ducks, Mergansers, Coots, Gallinules | Oct. 8 - Nov. 26 |
| Rails, Virginia & Sora; Snipe, Wilson | Sep. 15 - Nov. 15 |
| Geese | Oct. 1 - Nov. 30 |

TRAPPING SCHEDULE FOR THE 1975-1976 SEASON

| | |
|------------------------|-------------------|
| Muskrat, Mink, Raccoon | Oct. 18 - Dec. 31 |
|------------------------|-------------------|

BEAVER AND OTTER TRAPPING SCHEDULE
FOR THE 1976 SEASON
(See Figure 9.)

| | |
|--------|-------------------|
| Area A | Jan. 1 - Apr. 25 |
| Area B | Feb. 28 - Apr. 25 |

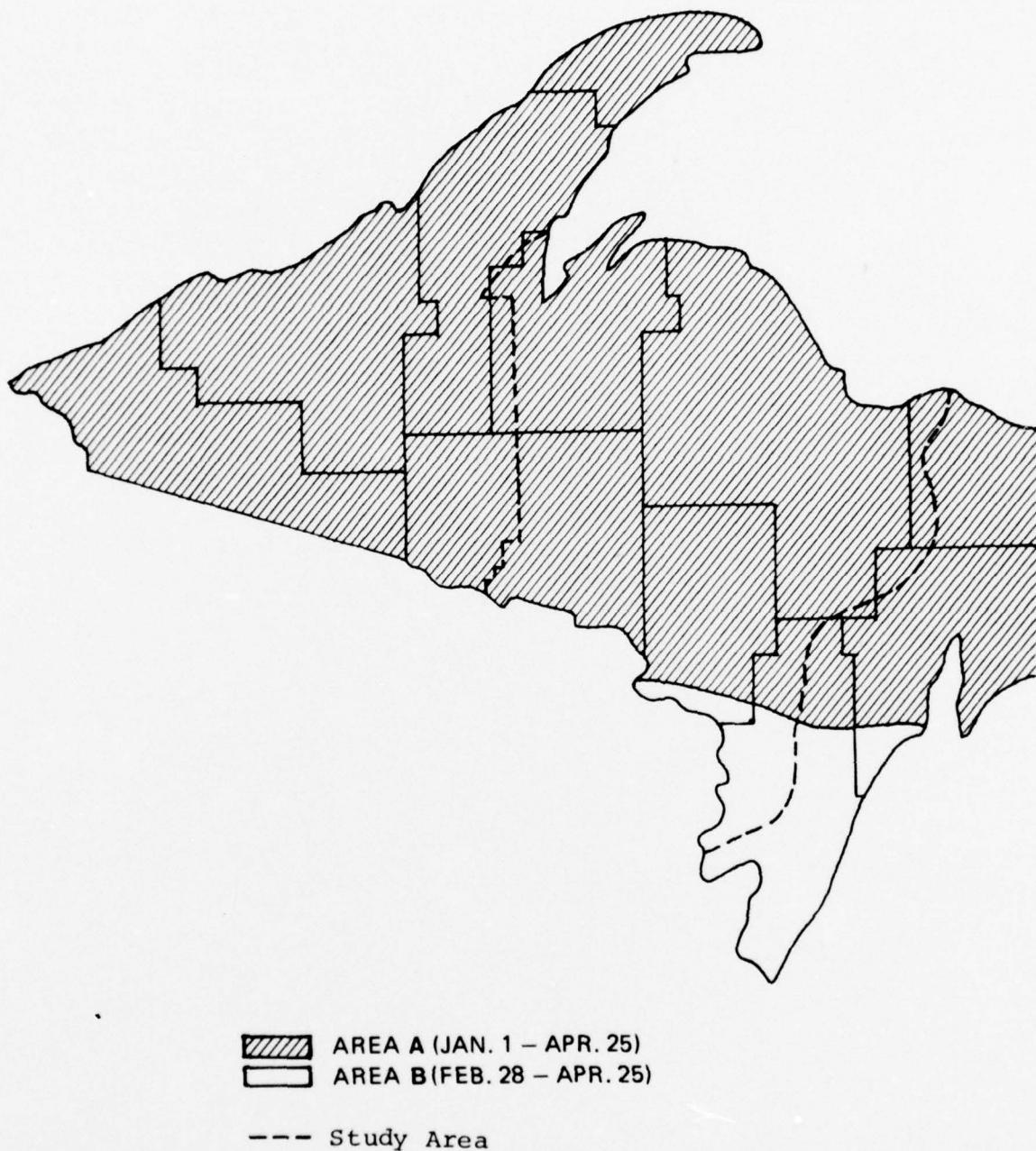
(a) Only in Menominee County, south of US-2 and Delta County south and west of the Escanaba River.

(b) Only Alger, Dickinson, Iron and Marquette Counties.

Source: Department of Natural Resources

Figure 9.

BEAVER AND OTTER TRAPPING SCHEDULE, 1976 SEASON



Fisheries Data

Fishing quality in the Upper Peninsula has remained fairly stable over the last 20 years. Many of the lakes and most of the streams are still relatively undeveloped. Only a few rivers around urban and/or industrial complexes have poor water quality so the distribution of fish is determined primarily by natural conditions. The larger lakes are mostly oligotrophic and many of the smaller lakes border on being acid bogs. Low annual mean temperatures tend to depress growth of many of the warm water species. Nevertheless, large rivers and streams that are too warm for trout have fairly good populations of smallmouth bass and northern pike, while other warm water species like yellow perch, rock bass, and such panfish as the bluegill dominate the warm-water lakes.

In cold streams and lakes brook trout and two forms of lake trout are native to the area, while successful exotics include the brown and rainbow trout. Brook trout are the foundation of the coldwater fishery. Rainbow trout run most of the streams during the spring.

Two unique fish populations are found in the Lake Michigan basin. One, the lake sturgeon in the Menominee River (Menominee County) represents the largest and the last naturally reproducing population in Michigan. The other, the muskellunge population in Iron Lake (Iron County), is supposedly unequalled in any other part of Michigan. Both of these populations are utilized as a source of eggs for hatchery propagation in an effort to expand their current range.

Pesticides, including PCBs are not currently a problem to fish populations, either directly or at the reproductive level. However they can become toxic to organisms farther up the food chain, for instance, eagles, osprey and man.

Most of the fish management activities involve maintenance plantings and introductions of game species. The Forest Service has extensive areas under management and many co-operative programs for developing the fishery resources are carried out between the DNR and the Forest Service. These include chemical rehabilitation, fish stocking, and access development.

Approximately five million warm water fish were planted in 13 inland lakes in 1972. The principal species was the Walleye. Most of the trout streams in the Study Area have sufficient natural reproduction and annual plantings are not

required. In 1972, 341,000 trout were stocked, primarily in inland lakes. The anadromous fish management program was initiated in 1966 with plantings in the Big Huron River in Baraga County. In 1972 over 400,000 coho and chinook salmon were planted in 3 areas. See Appendix C for species list.

Other Areas of Interest

McCormick Experimental Forest

The McCormick Experimental Forest (see Land Use Data Map) is a recent addition to the Ottawa National Forest and is administered by the North Central Forest Experiment Station, St. Paul, Minnesota. It is a solid block tract of land, 17,000 acres in size, with one good gravel access road extending a third of the distance into the area from the southwest.

The Forest Service feels the value of the McCormick Forest depends largely on its present isolation and its lack of use since early logging days. The geographic location of the forest is also ideal since it straddles the divide between the Lake Superior and Lake Michigan Basins. All river and stream drainage is outward, leaving the area almost totally free of any stream-borne pollutants.

Of special interest and concern is a 3,675-acre tract in the northeast corner on which little cutting has been done since the white pine logging days at the turn of the century. This tract was designated a Research Natural Area of the National Forest System in 1971, and is the largest such area in the northern hardwoods region.

The intent is to use this area as a basis of comparison to experimentally-logged areas to determine how such use alters the structure of the floral and faunal composition of a northern hardwood forest. To date, inventories have been taken and some research projects have been established.

Huron Mountain Club

This private club (see Wildlife Data Map) is used by its membership as a vacation retreat. A forest manager is employed and a Wildlife Foundation has been established which is providing part of the financial support for a timber wolf study begun this year.

Shooting Preserves

There are two private shooting preserves in the Study Area (see Wildlife Data Map). Both are licensed by the DNR under

a set of very strict regulations. One, the Smokey Lake Reserve, is a private club that sells memberships. The other, the Faithorn Pheasant Farm, is open to the public for a daily shooting fee.

The Smokey Lake Reserve is located in Iron County. It encompasses 13,000 acres, of which 6,000 are fenced. Two Hundred and forty acres are licensed for shooting by club members. As of July 1973, the stocked animals included canada geese, mallard duck, whitetailed deer, buffalo, American elk, red deer and black bear. The owner is P. C. Christiansen.

Located in Menominee County, the 400-acre Faithorn Pheasant Farm stocks pheasants and mallard duck. It is located two miles south and eight miles west of Hermansville, and about nine miles southeast of Vulcan. The owner is Ken C. LeGrave.

Sturgeon River Water Management Plan

Near Foster City in Dickinson County, the DNR and the Soil Conservation Service (SCS) have three impoundments on the Sturgeon River (see Surface Water Data Map). Structure 1, called Gene Pond, is an 800-acre impoundment. It has been stocked with approximately 65,000 largemouth bass, 35,000 walleye, 35,000 rainbow, 32,500 brown, and 15,600 brook trout in 1975. Similar fish plantings are expected for 1976. There have been about 100 wood duck boxes set up in the wooded fringe around the pond. Waterfowl usage is expected to be good. There have also been three osprey nesting platforms constructed around the pond.

Structure 2, Hardwood Pond, has just been completed and is expected to be filled with water during the 1976 spring rainy season. When full the structure will contain about 1,200 acres, and will be stocked with fish.

Structure 3 has not been named.

The pond is expected to have little value to wildlife, and though it will be planted with rainbow trout it will not be classified as a recreational impoundment. The structure will receive irrigation water from Hardwood Pond.

Sharp-tailed Grouse Management Areas

During previous times of intensive logging and frequent fires in the Upper Peninsula, the sharp-tailed grouse invaded the cleared areas. Their populations underwent the same surge the white-tailed deer experienced because their

requirements were similar. Because of current fire protection policies, fire cleared areas are dwindling and the sharp-tailed grouse populations are fading. The Michigan Department of Natural Resources is using fire, bulldozers, and occasionally chemicals to create and maintain openings for sharp-tailed grouse. The grouse will utilize these openings most of the year, but, during severe weather or when hunted, will fly into the surrounding forests. Grouse will utilize aspen buds as winter forage, and when cleared areas become reinvaded by aspen, they become prime grouse habitat.

Craig Lake State Park

Craig Lake State Park is a primitive area in eastern Baraga County. The DNR currently controls 5,700 acres and they plan to expand the park to over 10,700 acres.

Mini-wilderness Areas

Several areas have been considered by local biologists as possible "mini-wilderness areas," that is, areas which are too small to be established as true wilderness areas, but contain features which are thought to be unique. These areas are not protected by law as yet and have no official status. Some of the areas under consideration include a portion of the Sturgeon River in Baraga County as a wild and scenic river, and portions of Sections 1, 2, 11, 12, and 13 in T.42N., R.29W., in Dickinson County. Other area under consideration have not been disclosed.

Cable Attacking Wildlife

Wildlife species which could conceivably attack the underground cable are very limited. An accidental encounter with the cable is plausible, however. Such an encounter could occur with a woodchuck, which digs its den four to five feet deep. Other animals which utilize woodchuck dens, and therefore could also encounter the cable include coyotes, foxes, skunks and black bears. In the process of digging out a den they could chance upon a cable and treat it as they would a bothersome tree root, that is, gnaw on it to cut it in pieces and remove it. The limited research in this field has shown that gnawing mammals, in this case gophers (*Geomys* sp.) will not avoid the cable but will in fact chew on it. It can therefore be assumed that should the cable be chanced upon by rodents (e.g., the woodchuck, porcupine, thirteen-lined ground squirrel, etc.) they will gnaw on the cable and perhaps reduce its effectiveness. Inquiries to Michigan Bell Telephone Company have led to no additional problem animals.

RELATIONSHIP TO OTHER DATA

The Upper Peninsula has been economically depressed for years and has been referred to as one of the critical problem areas of the United States. The forest products industry is one of the major industries in the economy of the region and likely will be for some time. Reforestation of thousands of acres of nonstocked land was initiated over 30 years ago and is continuing on a large scale at present. This report includes a number of instances where past forestry practices have been detrimental to many wildlife species. Yet in light of the importance of this industry to the area, it will obviously continue to be given the highest priority by regional planners. However, many of the past problems of changing plant succession have been partially resolved by updated plans for managing the State Forests. The crux of this new management planning is the recommendation that timber management be modified to give as much consideration as possible to wildlife management. It is felt that only a modest modification in timber harvesting practices is needed to substantially improve wildlife habitat. These practices are under current experimentation, together with improvement practices directed at the development of wildlife openings, hunter access routes and the planting of food and cover species. In this regard, the wildlife of the Upper Peninsula is very closely related to land use practices and to the degree foresters and wildlife managers are able to work together in manipulating soil, vegetation and surface water impoundments to the benefit of wildlife without substantially affecting the production and harvest of timber.

Recreation is probably the most rapidly expanding industry in Michigan, and hunting and fishing are a primary kind of recreation. The resident population of the Study Area is not expected to increase significantly in the next 30 years. However, the latent demand for both hunting and fishing opportunities by southern Michigan and Wisconsin residents is expected to be of considerable importance in determining the future economy of the Study Area. It is on this basis that the Michigan Department of Natural Resources is expending considerable effort and money on new fish stocking programs, waterfowl and other types of wetland development, rehabilitation of depleted deer ranges, and on promotional programs designed for political and financial support of sportsmen's clubs and environmentally oriented organizations such as the Huron Mountain Club and the Audubon Society.

VALIDITY

The information contained in this report was obtained from three sources: (1) published descriptions, checklists, maps and other forms of literature related in whole or in part to the Study Area; (2) unpublished project reports, checklists, departmental status reports and information circulars, maps and management plans; (3) personal communication and interviews with personnel of Federal and State land management agencies, State educational institutions and private interested individuals.

The literature bibliography shows the main sources of inventory data. The personnel bibliography acknowledges the individuals, their areas of expertise, and the type of information each so willingly made available. An incomparable amount of assistance and cooperation was provided by the Michigan Department of Natural Resources at the divisional, regional, and district offices, and by the U. S. Forest Service on the Hiawatha and Ottawa National Forests. Of special significance was the help received from Arlow Boyce and John Schrouder of the Michigan Department of Natural Resources, Drs. William Robinson and J. K. Werner of the Northern Michigan University Biology Department, and Dr. G. J. Wallace, Michigan State University (Emeritus).

The authorities and publications listed below have been followed when assigning scientific and common names to species within the respective groups. Mammals: Jones et al., 1975, Revised Checklist of North American Mammals North of Mexico. Birds: American Ornithologist's Union, 1957, Checklist of North American Birds, 5th Ed. through the 32nd Supplement. Herptiles: Smith, 1961, The Amphibians and Reptiles of Illinois, supplemented by Conant, 1958, A Field Guide to Reptiles and Amphibians. Fish: Bailey, 1968, Checklist of the Fishes of Michigan. No subspecific names were used except with rare, threatened and protected species. The term "game animal," or "game species," is used specifically to refer to those animals so designated by Michigan law. However, there are a few species which are regulated by the DNR as a "game species" even though not officially classified as such.

The rare and endangered species list promulgated by the Michigan Department of Natural Resources was developed in cooperation with State Universities and the Environmental and Natural Resources Commission.

The U. S. Department of the Interior's threatened and endangered species were taken from the list published in the Federal Register, Friday Spetember 26, 1975, pages 44418-44423.

The lists of game species, nongame mammals, and reptiles and amphibians were cross-checked with several authorities and are considered highly accurate and complete. The fish list was reviewed by DNR fish specialists and reflects their evaluation of the present status of this group. The list of birds in Appendix B is a best estimate compilation. An attempt was made to include only those species which might be found in the Study Area. However, in a number of cases such precise information is lacking. An original list was compiled from the following literature sources: Peterson, 1947; Zimmerman, 1959; Wood, 1951; and various volumes of the Jack Pine Warbler, the official publication of the Michigan Audubon Society. This list was then modified by information supplied through personal communication with local ornithologists, and a final revision was made by comparing it with a checklist supplied by Dr. G. J. Wallace. When a species was definitely known to frequent the Upper Peninsula, but doubt existed as to whether or not it would be found within the Study Area, it was included on the final list.

Except for the beaver and otter, the hunting and trapping dates and seasons listed in Table 4 are considered highly predictable. The DNR does not at this time anticipate lengthening of the seasons or change in open season dates within the foreseeable future. The possibility always exists that a hunting season might be shortened or closed if any new or continuing study indicate that a particular game species, or closely associated nongame species, needs additional protection. An example is the recent closure to land trapping in the vicinity of the Huron Mountains to protect the timber wolf. The beaver and otter seasons, however, may occur at various times during February, March, and April and are not predictable.

PERSONNEL BIBLIOGRAPHY

Aartila, R. F., District Wildlife Biologist, Escanaba, Michigan. Update Wildlife Data Maps.

Amman, George A. Ornithologist, Department of Natural Resources Wildlife Division, Lansing: Historical reference material for game birds; eagle and osprey nesting sites; avifauna species verification and status.

Bailey, R. E., Regional Wildlife Biologist, Marquette, Michigan. Update Wildlife Data Maps, especially Moose and Wolf.

Blouch, Ralph I., Senior Wildlife Executive, Michigan Department of Natural Resources, Wildlife Division, Lansing, Michigan. Endangered and Threatened Plants in Michigan.

Bourdo, Dr. Eric. Michigan Technical University: Verification of bird species.

Boyce, Arlow P., Wildlife Planning Executive, Michigan Department of Natural Resources, Wildlife Division, Lansing, Michigan. Personnel contacts within Wildlife Division, Management Plans, Maps.

Davenport. LaVerne A., Senior Wildlife Executive, Michigan Department of Natural Resources, Wildlife Division, Lansing, Michigan. Wildlife Management Plans.

Durling, T. B. Regional Fish Biologist, Michigan Department of Natural Resources, Marquette: Present species status.

Gregg, G. Thomas. District Parks Supervisor, Michigan Department of Natural Resources, Baraga: Parks as relating to wildlife.

Illnickey, Nick J., Marquette: Avifauna species verification; status information from his unpublished manuscript on birds of Marquette.

Jacob, B. L., District Fisheries Biologist, Crystal Falls, Michigan. Update of Fishery Programs in District 2.

Martz, Gerald F., Wetland Management Section, Michigan Department of Natural Resources, Wildlife Division, Lansing, Michigan. Waterfowl and Wildlife Flooding Projects.

Mikula, Edward J., Supervisor, Wetland Wildlife Section, Michigan Department of Natural Resources Wildlife Division, Lansing: Waterfowl species verification and status; resource material.

Rafferty, Robert R., District Wildlife Biologist, Baraga Michigan, Update of Wildlife Data Maps.

Robertson, J. M., District Fisheries Biologist, Baraga, Michigan. Update Fisheries Information.

Robinson, W. L., Professor of Biology, Northern Michigan University, Marquette, Michigan. Update Fauna Lists for Wester U.P.

Robinson, Dr. William. Biology Department, Northern Michigan University, Marquette: Unpublished wolf status manuscript (see literature site); reference material on Huron Mountain Club wolf release and McCormick Forest species verification of small nongame mammals.

Ruch, Lewis C. Wetland Habitat Management, Michigan Department of Natural Resources Wildlife Division, Lansing: Wetland and waterfowl project maps and status.

Schorfhaar, Richard. Fisheries Habitat Biologist, Michigan Department of Natural Resources, Marquette: Verification of species endemic to Great Lakes region.

Schrouder, John D., Inland Fisheries Specialist, Michigan Department of Natural Resources, Fisheries Division, Lansing, Michigan. Current Fisheries Management Plans.

Somerville, Jim. USFS, Ottawa National Forest, Ironwood: "Hole in the Doughnut" and Sylvania plans.

Stuewer, Frederick, W., Senior Wildlife Executive, Michigan Department of Natural Resources, Wildlife Division, Lansing, Michigan. Endangered and Threatened Higher Vertebrates in Michigan.

Taylor, W. E., Wildlife Biologist, Hiawatha National Forest Escanaba, Michigan. Update Wildlife Data Maps, Especially Sandhill Crane Areas.

Taylor, Charlotte, Escanaba: Verification of bird species.

Vogt, Joseph E. Forest Wildlife Biologist, Michigan Department of Natural Resources Wildlife Division, Lansing: Wildlife status.

Wagner, Warren, Ph.D., Chairman, Technical Advisory Committee on Plants, State of Michigan; Professor of Botany, University of Michigan.

Wallace, Dr. George J. Michigan State University (Emeritus): Checklist verification of Upper Peninsula bird species.

Wenzel, D. K., District Wildlife Biologist, Crystal Falls, Michigan. Update of Wildlife Data Maps.

Werner, Dr. J. K. Biology Department, Northern Michigan University, Marquette: Reptile and amphibian status species verification and checklist; maps of authenticated specimens compiled by Dr. Max Hensley, Michigan State University.

LITERATURE BIBLIOGRAPHY

American Ornithologists Union, 1973. Thirty-second Supplement to the American Ornithologists' Union Checklist of North American Birds. *Auk* 90:411-419.

Ammann, G. A., 1973. The 1972 grouse hunting season, with prospects for 1973. Michigan Department of Natural Resources., Wildlife Division, Report 2705, 4 pp.

Ammann, G. A., 1957. The prairie grouse of Michigan. Michigan Department of Conservation, Game Division 200 pp.

Bailey, R., 1968. Checklist of the fishes of Michigan (unpublished).

Belleroose, Frank C., 1968. Waterfowl migration corridors east of the Rocky Mountains in the U.S. Biological Notes 61. Ill. Nat. Hist. Surv. Div., Urbana, Ill.

Bookhout, T. A., 1965. The snowshoe hare in Upper Michigan; its biology and feeding coactions with white-tailed deer. Michigan Department of Conservation Resources and Development Report 38, 191 pp.

Borges, D. P., ed., 1970. Coho salmon status report 1967-68. Michigan Department of Natural Resources, Fish Division, Fish Management Report 3.

Boyce, A. P., and Bernard, R., 1972. Legal authority governing the management of wildlife resources in Michigan. Michigan Department of Natural Resources, Wildlife Division Information Circle 165, 23 pp.

Burt, W. H., 1957. Mammals of the Great Lakes Region. Univ. Mich. Press. 246 pp.

Carter, L. J., 1968. Lake Michigan: salmon help to redress the balance. *Science* 161:551-555.

Conant, R., 1958. A Field Guide to Reptiles and Amphibians of Eastern North America. Houghton Mifflin Co. 364 pp.

Ellefson, P. V., and Jamsen, G. C., 1971. Economic appraisal of Michigan's salmon and steelhead sport fishery, April 25-August 31, 1970. Michigan Department of Natural Resources Res. and Deve. Report 243, 21 pp.

Ellefson, P. V., and G. C. Jamsen, 1971. Economic Appraisal of Michigan's sport fishery, January 1-April 24. Michigan Department of Natural Resources Res. and Dev. Report 227, 36 pp.

Great Lakes Basin Framework Study. 1972. Appendix No. 8 fish Draft No. 2, 550 pp.

Great Lakes Basin Framework Study, 1973. Appendix No. 17 Wildlife Draft No. 3 (in part).

Hall, R. E., and K. R. Kelson, 1959. The Mammals of North America, Vol. 1 and 2. The Ronald Press Co., N.Y. 1983 pp.

Hawn, L. J., 1973. Michigan furbearer catch by trappers, 1971-1972. Michigan Department of Natural Resources Surv. and Stat. Serv. Report 121, 3 pp.

Hawn, L. J., 1973. Michigan small game kill estimates, 1971. Michigan Department of Natural Resources Surv. and Stat. Serv. Report 119, 9 pp.

Hendrickson, J., Robinson, W. L., and Mech, L. D., 1974. Status of the wolf in Michigan, 1973. J. Mammal, (in press).

Hubbs, C. L., and Lagler, K. F., 1970. Fishes of the Great Lake Region. University of Michigan Press, An Arbor, Michigan. 213 pp.

Jamsen, G. C., 1972. Michigan's 1971 sport fishery. Michigan Department of Natural Resources, Res. and Dev. Report 268, 7 pp.

Jones, J. K., Jr., D. C. Carter, and N. H. Genoways, 1975. Revised Checklist of North American Mammals North of Mexico. Occasional Papers Museum Texas Technical University 28:1-14.

Manville, R. H., 1948. The vertebrate fauna of the Huron Mountains, Michigan. Amer. Midl. Nat. 39:615-640.

Michigan Department of Natural Resources, 1966. Game Division long range program for (1) land acquisition, (2) wildlife habitat improvement. 9 pp (mimeo.)

Michigan Department of Natural Resources, 1969-1970. Game Division 25th Biennial Report 29 pp.

Michigan Department of Natural Resources, 1967-1968. Game Division 24th Biennial Report, 27 pp.

Michigan Department of Natural Resources, 1965-1966. Game Division 23rd Biennial Report. 30 pp.

Michigan Department of Natural Resources, 1973. Large waterfowl projects: major emphasis on geese. 6 pp (mimeo.)

Michigan Department of Natural Resources, 1973. Michigan's Great Lakes trout and salmon fishery. Fisheries Management Report 5, 105 pp.

Michigan Department of Natural Resources, 1973. Michigan licensed shooting preserves open to the public. 4 pp (mimeo.)

Michigan Department of Natural Resources, 1973. Michigan projected populations: 1970-1990. 2 pp. (mimeo.).

Michigan Department of Natural Resources, 1972. Waterfowl and wetlands management. 33 pp. (mimeo.).

Michigan Department of Natural Resources, 1973. Wetland projects the Michigan Department of Natural Resources is currently interested in in the Upper Peninsula. 2 pp., (mimeo.).

Natural History Society, 1973. McCormick Experimental Forest. Naturalist 24(1):1-32.

Robbins, C. S., B. Bruun, H. S. Zim, and A. Singer, 1966. Birds of North America, Golden Press, New York, 340 pp.

Smith, P. W., 1961. The Amphibians and Reptiles of Illinois. Illinois Natural History Survey Bulletin 28:298 p.

U.S. Department of the Interior, 1968. Rare and endangered wildlife of the United States. Resource Publication 34.

Verme, L. J., 1965. Swamp Conifer Deeryards in Northern Michigan; their ecology and management. J. For 63(7): 523-529.

Verme, L. J., 1972. The Way to a "Million Deer," Upper Michigan Portion. Michigan Department of Natural Resources, Res. and Dev. Report 258. 7 pp.

Wallace, G. J., 1969. Endangered and declining species of Michigan birds. Jack Pine Warbler 47:70-75.

Wood, N. A. 1951. The Birds of Michigan. Museum of Zoology Miscellaneous Publication 75. University of Michigan Press, Ann Arbor, Michigan. 559 pp.

Wood, R. D., 1975. Black Grouse in Michigan, Michigan Department of Natural Resources, Lansing, Michigan, 3 p.

Zimmerman, D. A., and Van Tyne, J., 1959. A Distributional Checklist of the Birds of Michigan. University of Michigan Museum of Zoology Occas. Paper 608. Ann Arbor, Michigan 63 pp.

APPENDIX A
GAME SPECIES

GAME SPECIES

Mammals and Furbearers

Bear, black (*Ursus americanus*)
Deer, whitetailed (*Odocoileus virginianus*)
Hare, snowshoe (*Lepus americanus*)
Rabbit, eastern cottontail (*Sylvilagus floridanus*)
Squirrel, *fox (*Sciurus carolinensis*)
gray (*Sciurus carolinensis*)
red (*Tamiasciurus hudsonicus*)

*Badger (*Taxidea taxus*)
Beaver (*Castor canadensis*)
Bobcat (*Lynx rufus*)
Coyote (*Canis latrans*)
Fox, gray (*Urocyon cinereoargenteus*)
red (*Vulpes fulva*)
Mink (*Mustela vison*)
Muskrat (*Ondatra zibethicus*)
Otter (*Lutra canadensis*)
Raccoon (*Procyon lotor*)
Skunk, striped (*Mephitis mephitis*)
Weasel, least (*Mustela rixosa*)
long-tailed (*Mustela frenata*)
short-tailed (*Mustela erminea*)

Upland Birds

Grouse, ruffed (*Bonasa umbellus*)
*spruce (*Canachites canadensis*)
sharptailed (*Pedioecetes phasianellus*)
Pheasant, ring-necked (*Phasianus colchicus*)
*Turkey (*Meleagris gallopavo*)
Crow, common (*Corvus brachyrhynchos*)

Waterfowl

*Swan, whistling (*Olor columbianus*)

Goose, blue (*Chen caerulescens*)
Canada (*Branta canadensis*)#
snow (*Chen hyperborea*)

*Brant (*Branta bernicla*)

Bufflehead (*Bucephala albeola*)#
Canvasback (*Aythya valisineria*)

Duck, black (*Anas rubripes*)#
ring-necked (*Aythya collaris*)#
ruddy (*Oxyura jamaicensis*)#P
wood (*Aix sponsa*)#

*Eider, King (*Somateria spectabilis*)

Gadwall (Anas strepera)
Goldeneye, common (Bucephala clangula)#
Mallard (Anas platyrhynchos)#
Merganser, common (Mergus merganser)#
 hooded (Lophodytes cucullatus)#
 red-breasted (Mergus serrator)#
Oldsquaw (Clangula hyemalis)
Pintail (Anas acuta)#P
Redhead (Aythya americana)
Scaup, greater (Aythya marila)
 lesser (Aythya affinis)
Scoter, common (Oidemia nigra)
 surf (Melanitta perspicillata)
 white-winged (Melanitta deglandi)
Shoveler (Spatula clypeata)#P
Teal, blue-winged (Anas discors)#
 green-winged (Anas carolinensis)#
Widgeon, American (Mareca americana)
 *European (Mareca penelope)

- Known to breed in project area.

#P - Possible nester, but uncertain; if it does, the numbers are small.

Marsh and Shorebirds

Coot, American (Fulica americana)
Gallinule, common (Gallinula chloropus)
Rail, sora (Porzana carolina)
 Virginia (Rallus limicola)
 *yellow (Coturnicops noveboracensis)
Snipe, common (Capella gallinago)
Woodcock, American (Philohela minor)

Although defined by Michigan law as "game birds", there is no open season (state-wide or UP only) on any of the following marsh and shorebirds nor on any of the preceding game animals marked with an asterisk (*).

Dowitcher, long-billed (Limnodromus scolopaceus)
 short-billed (Limnodromus griseus)
Dunlin (Erolia alpina)
Godwit, Hudsonian (Limosa haemastica)
 marbled (Limosa fedoa)
Killdeer (Charadrius vociferus)
Knot (Calidris canutus)
Phalarope, northern (Lobipes lobatus)
 red (Phalaropus fulicarius)
 Wilson's (Steganopus tricolor)

Plover, American golden (Pluvialis dominica)
black-bellied (Squatarola squatarola)
piping (Charadrius melanotos)
semipalmated (Charadrius semipalmatus)
upland (Bartramia longicauda)
Sanderling (Crocethia alba)
Sandpiper, Baird's (Erolia bairdii)
 buff-breasted (Tryngites subruficollis)
 least (Erolia minutilla)
 pectoral (Erolia melanotos)
 semipalmated (Ereunetes pusillus)
 solitary (Tringa solitaria)
 spotted (Actitis macularia)
 stilt (Micropalama himantopus)
 western (Ereunetes mauri)
 white-rumped (Erolia fuscicollis)
Turnstone, ruddy (Arenaria interpres)
Whimbrel (Numenius phaeopus)
Willet (Catoptrophorus semipalmatus)
Yellowlegs, greater (Totanus melanoleucus)
 lesser (Totanus flavipes)

APPENDIX B
NONGAME SPECIES

MAMMAL SPECIES

Shrews and Moles

Short-tailed shrew (Blarina brevicauda)
Masked shrew (Sorex cinereus)

Bats

Big brown bat (Eptesicus fuscus)
Silver-haired bat (Lasionycteris noctivagans)
Red bat (Lasiurus borealis)
Hoary bat (Lasiurus cinereus)
Keen's myotis (Myotis keenii)
Little brown myotis (Myotis lucifugus)

Rodents

Northern flying squirrel (Glaucomys sabrinus)
Southern flying squirrel (Glaucomys volans)
Woodchuck (Marmota monax)
13-lined ground squirrel (Spermophilus tridecemlineatus)
Eastern chipmunk (Tamias striatus)
Redback vole (Clethrionomys gapperi)
Meadow vole (Microtus pennsylvanicus)
White-footed mouse (Peromyscus leucopus)
Deer mouse (Peromyscus maniculatus)
House mouse (Mus musculus)
Norway rat (Rattus norvegicus)
Meadow jumping mouse (Zapus hudsonius)
Woodland jumping mouse (Napaeozapus insignis)
Porcupine (Erethizon dorsatum)

BIRD SPECIES

Bittern, American (Botaurus lentiginosus)
Least (Ixobrychus exilis)
Blackbird, Brewer's (Euphagus cyanocephalus)
Red-winged (Agelaius phoeniceus)
Rusty (Euphagus carolinus)
Yellow-headed (Xanthocephalus xanthocephalus)
Bobolink (Dolichonyx oryzivorus)
Bunting, Indigo (Passerina cyanea)
Snow (Plectrophenax nivalis)
Cardinal (Richmondena cardinalis)
Catbird (Dumetella carolinensis)
Chickadee, Black-capped (Parus atricapillus)
Boreal (Parus hudsonicus)
Cormorant, Double-crested (Phalacrocorax auritus)
Cowbird, Brown-headed (Molothrus ater)
Creeper, Brown (Certhia familiaris)
Crossbill, Red (Loxia curvirostra)
White-winged (Loxia leucoptera)
Crow, Common (Corvus brachyrhynchos)
Cuckoo, Black-billed (Coccyzus erythrophthalmus)
Yellow-billed (Coccyzus americanus)
Dickcissel (Spiza americana)
Dove, Mourning (Zenaidura macroura)
Rock (Columba livia)
Eagle, Golden (Accipiter chrysaetos)
Egret, Common (Casmerodius albus)
Finch, Purple (Carpodacus purpureus)
Flicker, Yellow-shafted (Colaptes auratus)
Flycatcher, Acadian (Empidonax virescens)
Great Crested (Myiarchus crinitus)
Least (Empidonax minimus)
Olive-sided (Nuttallornis borealis)
Traill's (Empidonax traillii)
Yellow-bellied (Empidonax flaviventris)
Gnatcatcher, Blue-gray (Polioptila caerulea)
Goldfinch, American (Spinus tristis)
Goshawk (Accipiter gentilis)
Grackle, Common (Quiscalus quiscula)
Grebe, Horned (Podiceps auritus)
Pied-billed (Podilymbus podiceps)
Red-necked (Podiceps grisegena)
Grosbeak, Evening (Hesperiphona vespertina)
Rose-breasted (Pheucticus ludovicianus)
Gull, Bonaparte's (Larus philadelphicus)
Franklin's (Larus pipixcan)
Glaucous (Larus hyperboreus)
Great Black-backed (Larus marinus)
Herring (Larus argentatus)

Gull, Iceland (Larus glaucopterus)
Little (Larus minutus)
Ring-billed (Larus delawarensis)
Hawk, Broad-winged (Buteo platypterus)
Pigeon (Falco columbarius)
Red-tailed (Buteo jamaicensis)
Rough-legged (Buteo lagopus)
Sharp-shinned (Accipiter striatus)
Sparrow (Falco sparverius)
Hawk-owl (Surnia ulula)
Heron, Great Blue (Ardea herodias)
Green (Butorides virescens)
Hummingbird, Ruby-throated (Archilochus colubris)
Jaeger, Parasitic (Stercorarius parasiticus)
Jay, Blue (Cyanocitta cristata)
Gray (Perisoreus canadensis)
Junco, Oregon (Junco oreganus)
Slate-colored (Junco hyemalis)
Kingbird, Eastern (Tyrannus tyrannus)
Western (Tyrannus verticalis)
Kingfisher, Belted (Megaceryle alcyon)
Kinglet, Golden-crowned (Regulus satrapa)
Ruby-crowned (Regulus calendula)
Lark, Horned (Eremophila alpestris)
Longspur, Lapland (Calcarius lapponicus)
Loon, Common (Gavia immer)
Red-throated (Gavia stellata)
Martin, Purple (Progne subis)
Meadowlark, Eastern (Sturnella magna)
Western (Sturnella neglecta)
Mockingbird (Mimus polyglottos)
Nighthawk, Common (Chordeiles minor)
Nuthatch, Red-breasted (Sitta canadensis)
White-breasted (Sitta carolinensis)
Oriole, Baltimore (Icterus galbula)
Orchard (Icterus spurius)
Ovenbird (Seiurus aurocapillus)
Owl, Barred (Strix varia)
Boreal (Aegolius funereus)
Great Gray (Strix nebulosa)
Great Horned (Bubo virginianus)
Long-eared (Asio otus)
Saw-whet (Aegolius acadicus)
Short-eared (Asio flammeus)
Snowy (Nyctea scandiaca)
Pelican, White (Pelecanus erythrorhynchos)
Pewee, Eastern Wood (Contopus virens)
Phoebe, Eastern (Sayornis phoebe)
Pipit, Water (Anthus spinolletta)
Raven, Common (Corvus corax)
Redpoll, Common (Acanthis flammea)
Hoary (Acanthis hornemannii)

Redstart, American (Setophaga ruticilla)
Robin (Turdus migratorius)
Sapsucker, Yellow-bellied (Sphyrapicus varius)
Shrike, Loggerhead (Lanius ludovicianus)
Northern (Lanius excubitor)
Siskin, Pine (Spinus pinus)
Sparrow, Chipping (Spizella passerina)
Clay-colored (Spizella pallida)
Field (Spizella pusilla)
Fox (Passerella iliaca)
Harris' (Zonotrichia querula)
House (Passer domesticus)
Le Conte's (Passerherbulus caudacutus)
Lincoln's (Melospiza lincolni)
Savannah (Passerculus sandwichensis)
Sharp-tailed (Ammospiza caudacuta)
Song (Melospiza melodia)
Swamp (Melospiza georgiana)
Tree (Spizella arborea)
Vesper (Pooecetes gramineus)
White-crowned (Zonotrichia leucophrys)
White-throated (Zonotrichia albicollis)
Starling (Sturnus vulgaris)
Swallow, Band (Riparia riparia)
Barn (Hirundo rustica)
Cliff (Petrochelidon pyrrhonota)
Rough-winged (Stelgidopteryx ruficollis)
Tree (Iridoprocne bicolor)
Swift, Chimney (Chaetura pelasgica)
Tanager, Scarlet (Piranga olivacea)
Tern, Black (Chlidonias niger)
Caspian (Hydroprogne caspia)
Common (Sterna hirundo)
Forster's (Sterna forsteri)
Thrasher, Brown (Toxostoma rufum)
Thrush, Gray-cheeked (Hylocichla minima)
Hermit (Hylocichla guttata)
Swainson's (Hylocichla ustulata)
Wood (Hylocichla mustelina)
Towhee, Rufous-sided (Pipilo erythrophthalmus)
Veery (Hylocichla fuscescens)
Vireo, Philadelphia (Vireo philadelphicus)
Red-eyed (Vireo olivaceus)
Solitary (Vireo solitarius)
Warbling (Vireo gilvus)
Yellow-throated (Vireo flavifrons)
Vulture, Turkey (Cathartes aura)
Warbler, Bay-breasted (Dendroica castanea)
Black-and-white (Mniotilla varia)
Blackburnian (Dendroica fusca)
Blackpoll (Dendroica striata)

Warbler, Black-throated Blue (Dendroica caerulescens)
Black-throated Green (Dendroica virens)
Blue-winged (Vermivora pinus)
Canada (Wilsonia canadensis)
Cape May (Dendroica tigrina)
Chestnut-sided (Dendroica pensylvanica)
Connecticut (Oporornis agilis)
Golden-winged (Vermivora chrysoptera)
Magnolia (Dendroica magnolia)
Mourning (Oporornis philadelphia)
Myrtle (Dendroica coronata)
Nashville (Vermivora ruficapilla)
Orange-crowned (Vermivora celata)
Palm (Dendroica palmarum)
Parula (Parula americana)
Pine (Dendroica pinus)
Prairie (Dendroica discolor)
Tennessee (Vermivora peregrina)
Wilson's (Wilsonia pusilla)
Yellow (Dendroica petechia)
Waterthrush, Northern (Seiurus noveboracensis)
Waxwing, Bohemian (Bombycilla garrula)
Cedar (Bombycilla cedrorum)
Whip-poor-will (Caprimulgus vociferus)
Woodpecker, Black-backed Three-toed (Picoides arcticus)
Downy (Dendrocopos pubescens)
Hairy (Dendrocopos villosus)
Northern Three-toed (Picoides tridactylus)
Pileated (Dryocopus pileatus)
Red-headed (Melanerpes erythrocephalus)
House (Troglodytes aedon)
Wren, Long-billed Marsh (Telmatodytes palustris)
Short-billed Marsh (Cistothorus platensis)
Winter (Troglodytes troglodytes)
Yellowthroat (Geothlypis trichas)

REPTILE AND AMPHIBIAN SPECIES

Salamanders

Mudpuppy (Necturus maculosus)
Newt, Red-spotted (Diemictylus viridescens)
Salamander, Blue-spotted (Ambystoma laterale)
Four-toed (Hemidactylum scutatum)
Red-backed (Plethodon cinereus)
Spotted (Ambystoma maculatum)

Frogs and Toads

Bullfrog (Rana catesbeiana)
Frog, Green (Rana clamitans)
Mink (Rana septentrionalis)
Northern Leopard (Rana pipiens)
Pickerel (Rana palustris)
Western Chorus (Pseudacris triseriata)
Wood (Rana sylvatica)
Peeker, Northern Spring (Hyla crucifer)
Toad, American (Bufo americanus)
Treefrog, Eastern Gray (Hyla versicolor)

Turtles

Turtle, Blanding's (Emydoidea blandingi)
Common Snapping (Chelydra serpentina)
Western Painted (Chrysemys picta)
Wood (Clemmys insculpta)

Lizard

Skink, Five-lined (Eumeces fasciatus)

Snakes

Snake, Eastern Garter (Thamnophis sirtalis)
Eastern Milk (Lampropeltis doliata)
Eastern Smooth Green (Opheodrys vernalis)
Northern Red-bellied (Storeria occipitomaculata)
Northern Ringneck (Diadophis punctatus)
Western Fox (Elaphe vulpina)
Water Snake, Northern (Natrix sipedon)

APPENDIX C
FISH

FISH SPECIES

Lamprey

Silver lamprey (Ichthyomyzon unicuspis)
Northern brook lamprey (Ichthyomyzon fossor)
Chestnut lamprey (Ichthyomyzon castaneus)
Sea lamprey (Petromyzon marinus)
American brook lamprey (Lampetra lamottei)

Gar

Spotted gar (Lepisosteus oculatus)
Longnose gar (Lepisosteus osseus)

Bowfin

Bowfin (Amia calva)

Herring

Alewife (Alosa pseudoharengus)
Gizzard shad (Dorosoma cepedianum)

Trout, Whitefish, and Grayling

Brown trout (Salmo trutta)
Rainbow trout (Salmo gairdneri)
Pink salmon (Oncorhynchus gorbuscha)
Coho salmon (Oncorhynchus kisutch)
Kokanee (Oncorhynchus nerka)
Chinook salmon (Oncorhynchus tshawytscha)
Brook trout (Salvelinus fontinalis)
Lake trout (Salvelinus namaycush)
Lake whitefish (Coregonus clupeaformis)
Cisco (Coregonus artedii)
Round whitefish (Prosopium cylindraceum)
Pygmy whitefish (Prosopium coulteri)

Smelt

American smelt (Osmerus eperlanus)

Mudminnow

Central mudminnow (Umbra limi)

Pike

Grass pickerel (Esox americanus)
Northern pike (Esox lucius)

Muskellunge (Esox masquinongy)

Minnow and Carp

Carp (Cyprinus carpio)
Goldfish (Carassius auratus)
Golden shiner (Notemigonus crysoleucas)
Creek chub (Semotilus atromaculatus)
Pearl dace (Semotilus margarita)
Redside dace (Gila elongata)
Finescale dace (Phoxinus neogaeus)
Southern redbelly dace (Phoxinus erythrogaster)
Northern redbelly dace (Phoxinus eos)
Lake chub (Couesius plumbeus)
Blacknose dace (Rhinichthys atratulus)
Longnose dace (Rhinichthys cataractae)
Stoneroller (Campostoma anomalum)
Hornyhead chub (Hybopsis biguttata)
River chub (Hybopsis micropogon)
Silver chub (Hybopsis storriana)
Bigeye chub (Hybopsis amblops)
Emerald shiner (Notropis atherinoides)
Silver shiner (Notropis photogenis)
Rosyface shiner (Notropis rubellus)
Redfin shiner (Notropis umbratilis)
Striped shiner (Notropis chryscephalus)
Common shiner (Notropis cornutus)
Ironcolor shiner (Notropis chalybaeus)
Weed shiner (Notropis texanus)
Blackchin shiner (Notropis heterodon)
Spottail shiner (Notropis hudsonius)
Bigmouth shiner (Notropis dorsalis)
Spotfin shiner (Notropis spilopterus)
Pugnose shiner (Notropis anogenus)
Sand shiner (Notropis stramineus)
Mimic shiner (Notropis volucellus)
Blacknose shiner (Notropis heterolepis)
Pugnose minnow (Notropis emiliae)
Silver jaw minnow (Ericymba buccata)
Brassy minnow (Hybognathus hankinsoni)
Bluntnose minnow (Pimephales notatus)
Fathead minnow (Pimephales promelas)

Sucker

Quillback (Carpioles cyprinus)
Spotted sucker (Minytrema melanops)
Lake chubsucker (Erimyzon suetta)
Creek chubsucker (Erimyzon oblongus)
Black redhorse (Moxostoma duquesnei)
Golden redhorse (Moxostoma erythrurum)
Silver redhorse (Moxostoma anisurum)

Northern redhorse (Moxostoma macrolepidotum)
Greater redhorse (Moxostoma valenciennesi)
River redhorse (Moxostoma carinatum)
Northern hog sucker (Hypentelium nigricans)
White sucker (Catostomus commersoni)
Longnose sucker (Catostomus catostomus)

Freshwater Catfish

Black bullhead (Ictalurus melas)
Brown bullhead (Ictalurus nebulosus)
Yellow bullhead (Ictalurus natalis)
Channel catfish (Ictalurus punctatus)
Tadpole madtom (Noturus gyrinus)
Margined madtom (Noturus insignis)
Stonewall (Noturus flavus)
Northern madtom (Noturus sp.)
Brindled madtom (Noturus miurus)
Flathead catfish (Pylodictis olivaris)

Trout Perch

Trout perch (Percopsis omiscomaycus)

Codfish and Hake

Burbot (Lota lota)

Killifish

Banded killifish (Fundulus diaphanus)
Starhead topminnow (Fundulus notti)
Blackstripe topminnow (Fundulus notatus)

Livebearer

Mosquitofish (Gambusia affinis)

Silverside

Brook silverside (Labidesthes sicculus)

Stickleback

Brook stickleback (Culaea inconstans)
Ninespine stickleback (Pungitius pungitius)

River Bass

White bass (Morone chrysops)

Sunfish

Smallmouth bass (Micropterus dolomieu)
Largemouth bass (Micropterus salmoides)
Warmouth (Chaenobryttus gulosus)
Green sunfish (Lepomis cyanellus)
Pumpkinseed (Lepomis gibbosus)
Longear sunfish (Lepomis megalotis)
Rock bass (Ambloplites reperstris)
White crappie (Pomoxis annularis)
Black crappie (Pomoxis nigromaculatus)

Perch

Walleye (Stizostedion vitreum)
Sauger (Stizostedion canadense)
Yellow perch (Perca flavescens)
Blackside darter (Percina maculata)
Logperch (Percina caprodes)
River darter (Percina shumardi)
Channel darter (Percina copelandi)
Northern sand darter (Ammocrypta pellucida)
Johnny darter (Etheostoma nigrum)
Greenside darter (Etheostoma blennioides)
Iowa darter (Etheostoma exile)
Rainbow darter (Etheostoma caeruleum)
Orangethroat darter (Etheostoma spectabile)
Barred fantail darter (Etheostoma flabellare)
Striped fantail darter (Etheostoma flabellare)
Least darter (Etheostoma microperca)

Drum

Freshwater drum (Aplodinotus grunniens)

Sculpin

Mottled sculpin (Cottus bairdi)
Slimy sculpin (Cottus cognatus)

Hybrid

Splake (Salvelinus fontinalis x S. namaycush)
Tiger Muskellunge (Esox lucius x E. masquinongy)